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ENGLISH BOTANY.

ENGLISH BOTANY;

OR,

COLOURED FIGURES

OF

BRITISH PLANTS.

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THE POPULAR PORTION BY MRS. LANKESTER.

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"WILD FLOWERS WORTH NOTICE," ETC. ETC.

Third Edition,

ENLARGED, RE-ARRANGED ACCORDING TO THE NATURAL ORDERS,
AND ENTIRELY REVISED.
WITH DESCRIPTIONS OF ALL THE SPECIES BY THE EDITOR.

VOLUME IX.

TYPHACEÆ TO LILIACEÆ.

LONDON:
GEORGE BELL & SONS, YORK STREET, COVENT GARDEN;
1883.

LONDON:
PRINTED BY WILLIAM CLOWES AND SONS, LIMITED,
STAMFORD STREET AND CHARING CROSS.

ENGLISH BOTANY

CLASS II.—MONOCOTYLEDONS.

HERBS, or rarely (and only in exotic genera) trees, with a stem in which the wood, pith, and bark are undistinguishable, as it consists wholly of cellular tissue in which are imbedded fibro-vascular strings passing into the leaves above. Seed containing an embryo having a single seed-leaf or cotyledon, in the axil of which lies the bud which is to form the future stem. Leaves generally with unbranched parallel or sub-parallel veins, or with a midrib from which such veins proceed, rarely with branched anastomosing veins. Parts of the flower generally 3 or some multiple of 3, rarely 4, 2, or 1. Calyx and corolla generally alike in texture, and both often coloured: on this account in the monocotyledons these terms are seldom employed, the floral envelopes being described under the general term of *perianth.*

SUB-ORDER I.—FLORIDÆ.

Essential organs of the flower surrounded by a perianth, or more rarely naked. Perianth of regularly whorled leaves or monophyllous.

ORDER LXXIV.—**TYPHACEÆ.**

Perennial aquatic or marsh herbs with creeping rhizomes. Stem simple or branched at the apex, cylindrical, leafy. Leaves alternate, lorate-linear, entire, parallel-nerved, sheathing. Flowers unisexual, monœcious, in continuous spikes or globular heads: in the latter case the heads are arranged in a raceme or panicle; in all cases the male flowers are placed above the female. Male flowers numerous, without any perianth, inserted directly upon the axis; the flowers intermingled with hairs or scales which have no regular arrangement round the separate flowers: stamens simple or shortly 2- or 3-forked at the apex; anthers oblong, erect, affixed by the base, 2-celled; the connective produced beyond the cells; pollen-grains globose. Female flowers without a perianth, intermingled with subclavate hairs or surrounded by 3 hypogynous scales: ovaries free or sometimes united in pairs, sessile or stipitate, 1-celled and 1-ovuled; ovule pendulous from the apex of the cell, anatropous; style simple; stigma unilateral, ligulate. Fruit subdrupaceous, membranous or spongy on the outside; the inner layer woody or coriaceous, and adhering to the seed. Seed with a very slender membranous testa; albumen abundant and fleshy; embryo straight, axial; radicle directed towards the hilum.

GENUS I.—**TYPHA.** *Tournef.*

Flowers monœcious, the male and female flowers in 2 separate spikes one above the other, contiguous or slightly separated; the male spike at the apex, frequently with large deciduous bracts intermingled with the flowers. Male flowers very numerous, without a perianth: stamens 1 to 6; filaments capillary, often monœcious, surrounded by a number of hairs (sterile stamens?) dilated at the apex. Female flowers without a perianth: ovary slender, stalked, surrounded by numerous hairs (abortive stamens?); style short; stigma simple, elongate, unilateral. Fruit minute, longly stalked, dry, subdrupaceous, with a woody endocarp and a membranous epicarp splitting lengthwise and separating from the endocarp when the fruit is ripe.

Aquatic plants with lorate-linear distichous leaves and brown or reddish spikes terminating the simple stem, both rising out of the water.

Dr. Withering says this genus of plants is the *τύφη* of the ancient Greeks, from *τῖφος*, a bog or marsh, this being the natural position of the species. (Theophr. iv. 11; Diosc. iii. 123.)

SPECIES I.—**TYPHA LATIFOLIA.** *Linn.*

PLATE MCCCLXXXV.

Reich. Ic. Fl. Germ. et Helv. Vol. XI. Tab. CCCXXIII. Figs. 747 and 748.
Billot, Fl. Gall. et Germ. Exsicc. No. 2942.

Leaves broadly linear, nearly flat, slightly glaucous. Male and female spikes contiguous, the former generally with subfoliaceous deciduous bracts. Female spike elongate, cylindrical, fuscous-brown in fruit: stigma lanceolate-ligulate; hairs of the axis of equal breadth throughout.

Var. *α*, *genuina*.

Leaves ¾ to 1 inch broad. Male and female spikes continuous.

Var. β, *media*.

T. media, *D.C.* Fl. Fr. Vol. V. p. 302.

Leaves ¼ to ¾ inch broad. Male and female spikes separated by a short interval.

In pools and ditches. Not uncommon, and generally distributed in England. Rare in Scotland, where I have seen it wild only in Wigtonshire; but it is recorded from the counties of Renfrew, Forfar, and Moray, and said by Neill to have formerly occurred in Orkney, but to be now extinct through drainage. Frequent throughout Ireland. Var. β in the bog near the windmill on Wimbledon Common, Surrey.

England, Scotland, Ireland. Perennial. Summer.

Rootstock thick, creeping, stoloniferous, sending up tufts of distichous leaves sheathing at the base, 3 to 6 feet high, varying in breadth from ½ to 1½ inch. Flowering spike rather shorter than the leaves, supported on a stout straight unbranched stem. Anthers yellow. Female spikes 5 to 9 inches long, at first about ½ inch in diameter and olive brown, in fruit about 1 inch across and blackish, by which time the male spike is reduced to a naked rachis. Fruit with fine light brown hairs on the stalk.

Common Cat's Tail.

French, *Massette à larges feuilles.* German, *Breitblättriges Kolbenrohr.*

This plant is known by the name of bulrush, cat's tail, or reed mace, and grows abundantly in pools or low streams, and is generally associated with the yellow iris and the common reed. It was known to the ancients. (Plin. 16, 36.)

The leaves of this plant are used largely by coopers to place between the staves of casks and tubs, to render them water-tight. The pollen from the sterile flowers is exceedingly inflammable, and is employed by the makers of fireworks as a substitute for that of the club moss. The down of the *amentum* has been used to stuff cushions and mattresses. All the species of cats' tails are very ornamental on the margins of lakes and pieces of water, and they afford favourable shelter to wild fowl; but as they increase rapidly, they must be cautiously introduced when the pool is small. This is the plant chosen generally by the early painters to represent the reed which was placed in our Saviour's right hand during His mockery by the Roman soldiers. In England the leaves are sometimes woven into mats and baskets, and occasionally cottages are thatched with them. In Dr. Clarke's travels we read that the stems of this species of grass are a favourite food with the Cossacks. Dr. Clarke calls it a cool and pleasant vegetable; but states that he was told by several Cossack officers, who had been in other countries, that it is only fit for food when it grows in the marshes of the Don.

SPECIES II.—**TYPHA ANGUSTIFOLIA.** *Linn.*

PLATE MCCCLXXXVI.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCXX. Fig. 744.
Billot, Fl. Gall. et Germ. Exsicc. No. 2943.

Leaves narrowly linear, nearly flat on the inside, slightly convex on the back, not glaucous. Male and female spikes separated by an interval of naked rachis; the former without subfoliaceous bracts. Female spike elongate-cylindrical, rusty colour in fruit: stigma linear-subulate; hairs of the axis slightly thickened towards the apex, so as to be somewhat scalelike.

In ditches and pools. Not unfrequent in England, and widely distributed. Very rare in Scotland, where it is said to grow in Loch Maben, Dumfries, Colvend Manse Loch, Kirkcudbright, and Lindores Loch, Fife. Rare in Ireland, and confined to Dublin and Antrim.

England, Scotland, Ireland. Perennial. Summer.

Very similar to T. latifolia, but readily distinguishable by its narrower leaves ($\frac{1}{3}$ to $\frac{5}{6}$ inch long), which are more convex on the back, and deep green, not glaucous. The spikes are always separated by about an inch, and occasionally the female spike is divided into 2 portions; it is usually longer and considerably thinner than in T. latifolia, not exceeding $\frac{3}{4}$ inch in breadth even in fruit, when it is of a bright rusty brown. The broader stigmas and hairs give a more scaly aspect to the spike than in T. latifolia.

Smith mentions that in the marshes of Great Oakley, Essex, the Rev. Revett Sheppard found what seems a variety of T. angustifolia, with much thicker fertile spikes than usual; and as it was growing with T. latifolia, Mr. Sheppard thought it might be a hybrid between the two.

Narrow-leaved Cat's Tail.

French, *Massette à feuilles étroites.* German, *Schmalblättriges Kolbenrohr, Schmale Rohrkolbe.*

GENUS II.—**SPARGANIUM.** *Tournef.*

Flowers monœcious; the male and female in several separate globular heads, one above the other in a spike, raceme, or panicle separated distinctly; the male flowers towards the apex of the stem, and also of the branches, when the flowers are paniculate; the separate heads, or at least the female ones, with large foliaceous persistent bracts. Male flowers very numerous: perianth none (?): stamens 3; filaments distinct or nearly so, surrounded by 3 to 6 scales dilated at the apex (sterile stamens?). Female flowers without a perianth (?): ovaries sessile or shortly stalked, free or united in pairs, surrounded by 3 to 6 imbricated membranous scales (abortive stamens?); style short; stigma elongate, unilateral. Fruit rather large, subsessile or shortly stalked, dry, subdrupaceous, with a woody endocarp and a spongy epicarp.

Aquatic plants with broadly linear distichous leaves and small globular heads of flowers, the latter rising above the water, which the leaves sometimes do, while in other cases they remain floating on the surface.

The name of this genus of plants is derived from the Greek word *σπάργανον*, a band, in allusion to the ribbon-shaped leaves. (Diosc. iv. 23.)

SPECIES I.—**SPARGANIUM RAMOSUM.** *Huds.*

PLATE MCCCLXXXVII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCXXVI. Fig. 751.
S. erectum, var. *α*, *Linn.* Spec. Pl. p. 1378. *Reich.* l. c. p. 2.

Radical leaves broadly linear, stiff, not floating, sharply keeled and triquetrous at the base, with the lateral faces channeled; stem leaves with their sheaths not inflated. Flowering stem erect, stiff, branched at the apex. Flower-heads in a panicle. Female flower-heads sessile on the lateral branches of the panicle, 1 to 3 on each branch. Male flower-heads very numerous, sessile towards the extremities of the lateral branches and termination of the rachis of the panicle. Stigma lanceolate-linear. Fruit sessile, prismatic-turbinate, with a conico-pyramidal or ovate-pyramidal top abruptly acuminated into a short beak. Leaves green, not pellucid.

In ditches and in shallow water by the sides of ponds and rivers. Common and generally distributed, but rare in the north of Scotland, though extending to Orkney.

England, Scotland, Ireland. Perennial. Summer.

Rootstock stoloniferous. Leaves numerous, 1½ to 5 feet long, ½ inch to 1 inch broad, the radical ones slightly channeled towards the base on the upper side, and with concave lateral faces; stem leaves flat from a sheathing base; lower bracts resembling the leaves, but shorter and amplexicaul, not sheathing; upper bracts much shorter than the lower ones. Stem stout, rather shorter than the leaves, the upper part with several alternate branches which have bracts at the base. Flower-heads globose; the female ones sessile along the branches, 1 or 2 placed about the middle of each branch or the lowest one terminating the branch. Male heads all sessile, olive-black before the anthers expand, smaller than the female, very numerous, on the continuation of the branches which bear the female heads, and also on the termination of the main stem itself above the highest branch, falling off after flowering and leaving the branch bare above the heads of fruit which are nearly 1 inch in diameter. Fruit ¼ inch long, dark olive, the height from the broadest part to the apex not much greater than the extreme width of the fruit; the beak or permanent part of the style about one-fourth of the length of the fruit.

Branched Bur-reed.

French, *Rubanier rameux.* German, *Ästige Igelskolbe.*

SPECIES II.—SPARGANIUM SIMPLEX. *Huds.*

PLATE MCCCLXXXVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCXXV. Fig. 750.
Billot, Fl. Gall. et Germ. Exsicc. No. 852.
S. erectum, var. β, *Linn.* Spec. Pl. p. 1378.

Radical leaves linear, usually stiff, rarely floating, in the former case rather sharply keeled, and triangular at the base, with the lateral faces flat; the stem-leaves with their sheaths not inflated. Flowering stem erect, stiff, simple. Flower-heads in a raceme. Female flower-heads 2 to 4, stalked, terminating the peduncles of the raceme, the uppermost one generally sessile upon the rachis itself. Male flower-heads 2 to 5, sessile on the upper part of the rachis of the raceme. Stigma linear-subulate. Fruit shortly stipitate, oblong-fusiform, with a conical top, gradually acuminated into a long beak. Leaves green, not pellucid, at least at the apex.

In ditches and shallow water, by the sides of ponds and pools, or in deep water, and then often barren, and with floating leaves. Rather common, and generally distributed, except in the north of Scotland.

England, Scotland, Ireland. Perennial. Summer.

S. simplex has much the habit of S. ramosum, but is a smaller plant, rarely above 18 inches or 2 feet high, with the leaves about ½ inch broad, of a yellowish green, and with the lateral faces at the base on each side of the keel flat, not concave. Male heads yellow before expansion. Female heads usually on a peduncle above the axil of the bract; the lowest peduncles in fruit 1 to 3 inches long; fruit-heads about ¾ inch across. Fruit about ¼ inch long, but much more slender than in S. ramosum, and equally attenuated at each end, the beak about ⅜ of the length of the fruit. The stalk not half the length of the part which contains the seed.

When growing in deep ditches, canals, or slow-running rivers, S. simplex has the leaves floating, and not distinctly triangular at the base; but in this state I have never seen it produce flowers: but Dr. Grenier states in the "Flore de France" that the fruit and styles and elongated stigmas distinguish it from the following species.

Reichenbach has figured the fruiting head of S. ramosum as that of S. simplex, and has fallen into a similar error in his description in "Icon. Fl. Germ. and Helv." vol. xi. p. 3.

Unbranched Bur-reed.

French, *Rubanier simple.* German, *Einfache Igelskolbe.*

SPECIES III.—**SPARGANIUM AFFINE.** *Schneitzl.*

Plate MCCCLXXXIX.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tabs. CCCXXIV. CCCCXVII. Fig. 925.
Billot, Fl. Gall. et Germ. Exsicc. No. 854.
S. natans, "*Linn.*" *Bab.* Man. Brit. Bot. ed. vi. p. 358. *Hook. & Arn.* Brit. Fl. ed. viii. p. 474. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 337 (non *Fries.*, test. *C.J. Hartmann,* Skand. Fl. ed. ix. p. 218).
S. simplex, var. Benth. Handbk. Brit. Fl. ed. ii. p. 434.
S. longifolium, *Don.* MS. (non *Turcz.*).

Leaves linear, flaccid, always floating, none of them triangular at the base; stem-leaves with the sheaths rather long, somewhat inflated. Flowering stem floating, rather stout, flaccid, simple (very rarely branched), the apex rising out of the water only at the time of flowering. Flower-heads in a raceme. Female flower-heads 2 to 5, rarely 6, stalked, terminating the peduncles of the raceme, the upper ones subsessile along the rachis itself. Male flower-heads 2 to 5, rarely 1 to 8, sessile on the extremity of the rachis of the raceme. Stigma lanceolate-ligulate. Fruit stipitate, lanceolate-fusiform, with an elevated conical top gradually acuminated into a long beak. Leaves green, not pellucid, at least at the apex.

In pools and lakes. Rather rare. Llyn-y-cwn, Llanberris, Carnarvon; the Lake district. Not uncommon in the counties of Kincardine and Aberdeen; Alvah, Banff; North Mavine, Shetland. Local in Ireland, but not unfrequent in Connemara, Donegal, and Antrim.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Rootstock stoloniferous. Stem flaccid, round, faintly striated, from 6 inches to 3½ feet long, according to the depth of the water in which it grows. Leaves long, floating, from ¼ to ⅝ inch broad, the lower flat above, slightly convex beneath. Bracts similar to the leaves, but broader in proportion, and firmer in texture. Peduncles of the lowest female-head 1 to 3 inches long in fruit, very rarely with 1 or 2 sessile heads beneath the terminal one; fruiting-heads floating, about ¾ inch in diameter. Fruit olive, about ¼ inch long

S. affine comes very near to S. simplex, and is often with difficulty distinguished from the floating state of the latter. The following differences are observable. In S. affine the sheaths of the stem-leaves are more inflated, the stigmas are more thickened and ligulate, shorter and more oblique than in S. simplex, and decidedly thicker than the style, the fruit is more attenuated at each end, having a longer stalk and a longer beak. In fruit the heads are more equally stalked, even the upper having commonly a short peduncle. The male heads are smaller, from the filaments being shorter, and the whole plant is of a deeper green, less inclining to yellow.

Whether S. affine be really distinct from the S. natans of Fries. I am unable to say. Both Nyman, in the "Sylloge Floræ Europeæ," and C. J. Hartmann, in the ninth edition of the "Handbuk i Skandinaviens Flora," separate them, the latter giving as synonyms of S. natans, *Fries*, S. Friesii, *Beurling* (whose paper I have been unable to see), and S. longifolium, *Turczaninow*. The principal points of difference seem to be the branched flower-stem and more numerous male heads of S. natans, *Fries*, but the stem is certainly occasionally branched in S. affine.

Specimens of S. affine from Shetland in the herbarium of the late Dr. Fleming were labelled by Don "S. longifolium, *Don*," but I am not aware that he ever gave a description of the species.

Floating Bur-reed.

French, *Rubanier flottant.* German, *Kleinste Igelskolbe.*

SPECIES IV.—**SPARGANIUM MINIMUM.** *Fries.*

PLATE MCCCXC.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCXXIV. Fig. 749.
Billot, Fl. Gall. et Germ. Exsicc. No. 853.
S. natans, *Linn.* Spec. Pl. p. 1378 (*ex parte*). *Sm.* Engl. Bot. ed. i. No. 273. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 786. *Crep.* Man. Fl. Belg. ed. ii. p. 310 (non *Linn.* Fl. *Lapp.*). *Fries.*

Leaves linear, flaccid, always floating, none of them triangular at the base. Stem-leaves with the sheaths short, not inflated. Flowering-stem floating, slender, flaccid, simple, the apex rising out of the water only at the time of flowering. Flower-heads in a spike-like raceme or spike. Female flower-heads 1 to 3, shortly stalked, terminating the peduncles of the raceme, the upper one, or sometimes all of them, sessile on the rachis itself. Male flower-head solitary, sessile on the extremity of the rachis. Stigma oblong-lanceolate. Fruit subsessile, ovate-ovoid, with a shortly conical top, rather suddenly acuminated into a short beak. Leaves olive-green, subpellucid.

In ditches and small pools, principally in peaty soil. Rather scarce, but generally distributed, though perhaps in some cases S. affine has been recorded for it.

England, Scotland, Ireland. Perennial. Summer.

Stem varying in length, according to the depth of the water, from 3 to 18 inches long. The leaves are very similar to those of S. affine, but of not so bright a green, and a thinner texture; the stem-leaves with shorter and less inflated sheaths. Female flower-heads rarely more than 2, the lower one with a stalk $\frac{1}{4}$ to 1 inch long, the upper one sessile, but frequently all the heads are sessile, or nearly so. Stigma shorter and thicker than in S. affine. Fruit-heads about $\frac{1}{2}$ inch in diameter. Fruit olive-yellow, $\frac{1}{5}$ inch long, more swollen in the middle, or a little below it, than in S. affine and S. simplex, and more abruptly acuminated into a beak, which is not above $\frac{1}{5}$ of the length of the fruit. The stalk of the fruit is similar to that of S. simplex, but shorter than that of S. affine.

Small Bur-reed

EXCLUDED SPECIES.

TYPHA MINOR. *Sm.*

Engl. Bot. ed. i. No. 1457.

Reported to have been found on Hounslow Heath, Middlesex, in the time of Dillenius, by Mr. Dandridge. It was also said that there was a specimen in the herbarium of the Botanic Gardens at Liverpool, brought from a large marl pit, to the north of Little Crosby, on the Lancashire coast in 1801. It has been reported from Kent, but the plant proved to be S. angustifolia.

ORDER LXXV.—**ARACEÆ.**

Perennial herbs, with tuberous rhizomes or corms or thickened creeping rhizomes, and with or without stems above ground. Leaves alternate or all radical, stalked, with the petiole sheathing at the base; the lamina large, variously shaped, entire or pedate, or cut in various ways, often cordate or hastate at the base, usually with branching and anastomosing veins, or with a central midrib, from which parallel veins run to the edge of the leaf, rarely with linear-lorate entire parallel-veined leaves, or (in one genus) with ensiform and equitant leaves. Flowers unisexual and monœcious, rarely perfect, arranged on a spadix, supported on a radical or axillary scape, and often surrounded by a spathe. Flowers, when unisexual, usually with the male flowers in the upper part of the spike, and the female in the lower, wholly covering the spadix, or only forming belts round it. Perfect flowers frequently with a rudimentary scale-like perianth of 4 to 8 leaves, and with 4, 6, 8, or more stamens surrounding a 1-, 2- or 3-celled ovary free from the perianth. Male flowers reduced to single stamens, which are free, or more or less united to each other; the anthers sometimes nearly or quite sessile. Female flowers reduced to naked ovaries, which are free or united with each other, 1- or many-celled and 1- or many-ovuled; ovules variously disposed, usually orthotropous or campylotropous; style simple or none; stigma capitate or discoid, undivided or lobed. Fruit generally a berry, rarely dry, with 1 or more cells, and 1 or more seeds. Seeds subglobular or angulated, with a coriaceous and often thick testa; albumen usually abundant, fleshy or farinaceous, rarely nearly absent; embryo straight, axial, extremity of the radicle pointing towards or away from the hilum.

TRIBE I.—ORONTEÆ.

Flowers perfect, surrounded by a membranous perianth of 6 leaves. Spathe replaced by a leaf-like bract, resembling a continuation of the stem, not convolute or tubular at the base, sometimes absent.

GENUS I.—**ACORUS.** *Linn.*

Spathe leaf-like, ancipitate, usually forming an apparent continuation of the 2-edged scape. Spadix inclined, or forming a continuation of the scape, pseudo-lateral, conico-cylindrical, wholly covered with perfect flowers. Perianth of 6 membranous oblong-oblanceolate obtuse persistent leaves, concave at the apex. Stamens 6, inserted in the base of the perianth leaves; filaments linear, flattened; anthers 2-celled, didymous. Ovary 2- or 3-celled, ovules numerous; stigmas sessile, punctiform. Fruit bluntly 6-sided, prismatical-clavate, herbaceous, indehiscent, 1- to 3-seeded. Embryo in the axis of the albumen; radicle directed towards the hilum.

Aquatic or marsh plants, with thick creeping rhizome and linear-ensiform equitant green leaves. Spadix appearing to come from the side of a flattened scape, from the bract being in the same line as the scape, and the spadix ascending at an angle into its scape; or forming a continuation of the scape, with the bract ascending at one side of it.

The name of this genus of plants is said to be derived from α, and κόρη, the pupil of the eye, as it was supposed to be a remedy in some diseases of the eye. (Diosc. i. 2.)

SPECIES I.—ACORUS CALAMUS. *Linn.*

PLATE MCCCXCI.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXIX. Fig. 956.
Billot, Fl. Gall. et Germ. Exsicc. No. 2143.

Leaves broadly ensiform, crimped at the edges. Scape similar to the leaves, the bract forming a direct continuation of the scape, many times exceeding the length of the spadix. Spadix ascending at an angle with the scape.

In shallow water, by the sides of rivers and ponds. Local, but widely distributed over the south of England, extending north to Yorkshire, but it is difficult to say in how many of its stations it is native. In Scotland it is an extremely doubtful native; it occurs in the water of Girvan, near the town of Girvan, and in the Bog of Culzean, Ayrshire; Castle Semple Loch and Loch Winnoch, Renfrewshire. In Ireland between Lisburn and Moira, co. Down (*Bab.*).

England, [Scotland, Ireland]. Perennial. Summer.

Rootstock creeping, branched, bearing some resemblance to that of Iris, but smoother, and green above, about as thick as the finger; the branches of the rhizome terminating in tufts of ensiform and equitant leaves, with shortly sheathing bases, 2 to 4 feet long, $\frac{3}{8}$ to $1\frac{1}{4}$ inch broad, acute, thickened in the middle, and more or less crimped along the edges; in other respects bearing a striking similarity to those of the genus Iris. Scape very similar to the leaves, from the axils of some of the outer leaves, bearing the spadix at the apex; the bract nearly as long as the scape. Spadix, in flower, 2 to 4 inches long, and not more than $\frac{1}{2}$ inch in diameter, tapering to a point, and thickly covered with flowers from the base to the apex; increasing in diameter in fruit, until it is about $\frac{3}{4}$ inch at the thickest portion. Perianth segments scarious, inconspicuous. Anthers yellow. Fruit prismatic-turbinate, yellowish green at the apex, which is shortly pyramidal and the only part visible from the close aggregation of the fruits. Leaves bright shining green, and, as well as the rootstocks, aromatic.

Sweet Flag.

French, *Acore odorant.* German, *Gemeiner Kalmus.*

This pleasant plant is well known as the inhabitant of marshy districts, and on the banks of rivers, lakes, and clear ditches. The long sword-shaped leaves are aromatic, and have a very agreeable smell. When rubbed in the hand they emit their scent very readily Its active qualities lie chiefly in the underground stem, or rhizome, which has been in medical use as a stimulant and aromatic tonic. In Norfolk, where it grows abundantly, it is still used by the peasantry as a remedy for ague. Dr. Withering tells us that the powder of the roots has cured agues when Peruvian bark has failed. Dr. Barton says his experience enables him to state "that in dyspeptic flatulence, and other disorders of the stomach, it merits the attention of the physician." Chewed, and the juice only swallowed, it is a pleasant remedy for indigestion, and by stimulating the salivary glands is a remedy for toothache.

The sweet flag was undoubtedly known to the Greeks, and was the *ἄκορος* of Dioscorides, and probably the *κάλαμος μυρεψικὸς* of Hippocrates and the *κάλαμος* of Theophrastus. It must not, however, be confounded with the *Calamus aromaticus*, which, according to Royle, was a species of grass. The tonic medicine known as Stockton bitter, in much esteem in some parts of England, is formed from the root of this plant and that of *Gentiana campestris*. For medicinal purposes the rhizomes are cut up into pieces four or five inches long, and dried. The roots of the yellow iris are often sold for it in the shops. It is also candied, and in Turkey is consumed as a sweetmeat in this form. It is largely used by perfumers as an ingredient in tooth powder, and to give scent to hair powder. Infused in liquids it imparts an aromatic taste and agreeable odour. Professor Johnston tells us, in his "Chemistry of Common Life," that it is used to give taste and fragrance to certain varieties of beer, and also to improve the flavour of gin. It is sent up to the London market chiefly from Norfolk, and as much as 40*l.* is sometimes given for the year's crop of a single acre of river-side land, on which it naturally grows. The leaves were used at one time largely for strewing the floors of churches, and were esteemed on account of the pleasant scent they give out when trodden on. Till very lately Norwich Cathedral was strewn with these rushes on certain festival occasions—a remnant of the old practice of covering all floors with rushes or boughs of trees.

TRIBE II.—AREÆ.

Flowers unisexual, androgynous—i.e. the male and female on the same spadix, without any perianth. Spadix surrounded by a spathe, which is convolute or tubular at the base.

GENUS II.—**ARUM.** *Linn.*

Spathe convolute at the base. Spadix free, cylindrical, naked and more or less clubshaped at the apex, with collars of unisexual flowers reduced to stamens and pistils. Male flowers uppermost, with a ring of appendiculate tubercles (abortive ovaries?) above them, and usually another ring of similar tubercles between the male and female flowers; anthers subsessile, free or united in pairs, 2-lobed, 1- or 2-celled. Ovaries 1-celled, with several ovules; style short or none; stigma tuftlike or peltate. Fruit fleshy, a 1-celled berry, with 1 or several seeds. Seeds subglobular, with a coriaceous reticulated testa; embryo in the axis of the albumen, radicle pointing away from the hilum.

Perennial stemless plants, with cormo-tuberous rhizomes and stalked cordate-sagittate or hastate-sagittate leaves, with reticulate venation.

Spathe appearing after the leaves, large, concave, much exceeding the spadix.

Dr. Mayne gives us ἄρον as the Greek analogue of the name of this genus of plants; hence its origin. (Theophr. vii. 11, 12.)

SPECIES I.—ARUM MACULATUM. *Linn.*

PLATE MCCCXCII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. VIII. Fig. 8.
Billot, Fl. Gall. et Germ. Exsicc. No. 465.

Leaves appearing in spring; petiole, measured from the top of the dilated sheath to the lamina, not exceeding the length of latter (including the basal lobes); lamina triangular-oblong, entire, deeply cordate-sagittate, with the basal lobes less than half, and usually not more than one-third of the length of the rest of the leaf. Spathe scarcely twice as long as the spadix, and often less, the upper part elliptical, with the edges inflexed, the apex not falling over till it fades. Abortive pistils above and below the anthers, and not much exceeding them in length; those below few in number.

On hedge-banks and in open woods. Common, and generally distributed in England. Rare in Scotland, where it is received as a native as far north as the Forth and Clyde; but I have not myself seen it in any Scotch station where it does not appear to have been planted. Frequent throughout Ireland, but less so in the north and west.

England, Scotland, Ireland. Perennial. Late Spring, early Summer.

Rootstock an ovoid-oblong tuber, descending at the apex, and dying off annually at the base like a corm, producing a few small axillary tubers, which eventually become separate plants, flowering when about the size of a filbert, and rarely exceeding the size of a large walnut. Leaves 3 to 5, all radical, sheathing the base of the stem, the petiole channeled above; lamina bent back so as to form an obtuse angle with the petiole, 4 to 9 inches long, including the lobes, the latter slightly bent upwards, with their inner margins contiguous and rounded; their outer margins continuous with those of the rest of the leaf, and their apex terminating in a rather sharp point. Spadix on a scape shorter than the petioles. Spathe 6 to 9 inches long, pale green, frequently edged with, and sometimes spotted with dull purple, contracted below the middle, the lower part loosely rolled round the base of the spadix, and concealing it, the upper part open when the plant is in flower, and at length decaying, leaving the lower portion enveloping the ovaries. Club of the spadix enlarged, naked, dull purple or yellow, cylindrical, obtuse, contracted a little way above the essential organs into a diameter of the same thickness as that of the rachis which bears them. Scape lengthening in fruit, until it exceeds the petioles of the leaves, which decay before the fruit changes from green to red. Berries rupturing the withered base of the spathe as they increase in size, about the size of currants, pale scarlet, in a compact oblong spike. Seeds usually 3 in each berry, more rarely 2, 4, or 1, subglobular, flattened on one side, scarcely as large as coriander seed, brownish yellow, reticulated. Leaves deep green, slightly shining, glabrous, concolorous or blotched with purplish black, paler and sprinkled with very minute pellucid dots beneath.

Common Cuckoo-pint.

French, *Gouet commun.* ·German, *Gefleckter Aron.*

Can we wonder at the delights of country children with this curious plant, which seems almost to be one of those things we constantly see in nature, designed to illustrate the grotesque as well as the beautiful? Its large handsome spathe, rising up amidst the elegantly-shaped spotted leaves, forms a fitting shelter for the bright coloured spadix or flower-stalk, the lord or lady, whichever it may be, within its protecting hood. The attractions of this curious plant do not cease with the early spring, when the green leaves have faded away, and the lords and ladies and their habitation are seen no more. The little bunch of seedlike bodies about half-way down the coloured spadix, which are, in fact, the pistils and seed-vessels, in the autumn of the year assume a brilliant red colour, looking like a bunch of coral, as, amid the withering grass of some hedgeside, they attract the notice of the passer-by. Beware, however, of being tempted to taste them! The whole plant is acrid, pungent, and poisonous, and children have suffered by eating the bright-coloured berries. The rhizomes contain a sort of farinaceous substance, which, when freed from its acrid qualities, becomes a nutritious article of diet. Large quantities of it are collected in Portland island, and on the dry and sunburnt districts on the banks of the Bristol Channel, and sold under the name of Portland sago. It is largely used to adulterate arrowroot. Dried and powdered, the root is used by the French as a cosmetic and in a lotion. It is sold at a high price, under the name of cypress powder. Dr. Withering quotes Wedelius for the supposition that it was on this plant, under the name of *chara*, that the soldiers of Cæsar's army subsisted when encamped at Dyrrachium. A curious belief is recorded by Gerarde, as coming from Aristotle, that bears, when half-starved with hybernating, having lain in their dens for forty days without any nourishment, but such as they get by "sucking their paws," are completely restored by eating this plant. In severe snowy winters, according to the observations of Mr. White, the roots are scratched out of the dry banks of hedges, and eaten by thrushes. In France the plant bears the name of *chou poivre* and *pain de lièvre*, as though eaten by hares. In some parts of Worcestershire the cuckoo-pint is known as "bloody men's fingers," and some writers have supposed it to be the long purples of Shakspeare, rather than *Orchis mascula*, though with less probability, we think. Medicinally the arum had at one time great reputation in common with other plants containing acrid or poisonous qualities. In rheumatism, gout, and even consumption, its virtues were vaunted, but are now happily discarded. The arum is one of those plants which exhibit the curious and interesting fact of the vegetable evolution of heat, so evident, that for some hours after the opening of the spathe it may be felt with the hands, or tested with the thermometer.

SPECIES II.—ARUM ITALICUM. *Mill.*

PLATE MCCCXCIII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XI. Fig. 11.

Leaves appearing in the beginning of winter; petiole, measured from the top of the dilated petiole to the lamina, usually much exceeding the length of the latter (including the basal lobes); lamina oblong-triangular, entire, deeply cordate-sagittate or hastate-sagittate, with the basal lobes about half as long as the rest of the leaf. Spathe about three times as long as the spadix, the upper part oval, concave; apex often falling over very shortly after expansion, and before it begins to fade. Abortive pistils above and below the anthers, and greatly exceeding them in length, those below the anthers rather numerous, though fewer than those above.

In shady places, on the undercliff in the Isle of Wight. Rather frequent from St. Laurence to Bonchurch, and probably extending further westward.

England. Perennial. Late Summer.

Very similar to A. maculatum, but a larger and stouter plant, the rhizome frequently attaining the size of a small egg, but more slender. Leaf-sheaths tougher, more tinged with purple. Petioles (exclusive of the sheath), 9 to 18 inches long; lamina (including the lobes), 6 inches to 1 foot long, more triangular, with the basal lobes longer than in A. maculatum, and, according to Mr. Hambrough, diverging; but the Isle of Wight plant, cultivated by me, has the lobes not more divaricate than in A. maculatum, but usually bent upwards sharply at a right angle: when the leaf is pressed flat in drying, the lobes diverge, and give the appearance of a hastate leaf, which I have never seen in the living plant, even in cultivated specimens of the continental A. Italicum. Spathe 8 to 15 inches long, greenish-white, thin, and apparently unable to support its own weight, as (at least in large examples) it falls over, commonly inwards, but sometimes outwards, a few hours after it expands. In small specimens this falling over frequently does not take place, and the edges become involute, as in A. maculatum, than which species A. Italicum flowers (in cultivation) a month or six weeks later. Abortive pistils twice as long in proportion as in A. maculatum. Naked summit of the club always pale yellow: in A. maculatum it is often purple, though sometimes pale yellow. Fruiting-scape 1 to 2 feet high; berries very similar to those of A. maculatum, but longer. Seeds usually only 1 or 2 in each berry, nearly as large as a sweet pea-seed, and consequently larger than in the common species. Leaves deep green, generally concolorous in the British plant, but sometimes marked with black blotches.

Mr. F. Townsend, who kindly sent me a fine series of fresh specimens from the Isle of Wight, tells me that there the leaves of A. Italicum have their basal lobes as often parallel as spreading, and that they are quite as liable to be spotted as those of A. maculatum, but that he never saw the spots of the former with a jagged outline, which often occurs in A. maculatum. He has never seen the veins white.

Seven or eight years ago, I received living plants of this from its discoverer, Mr. A. Hambrough, and have cultivated these ever since. The plant grows much more luxuriantly and flowers more freely with me in London than A. maculatum does.

I have also cultivated the true A. Italicum, brought me from Monaco by Mr. G. B. Robertson. Some of these have the leaves veined with white, and others have them concolorous. The leaves have the basal lobes much less bent upwards than in the Isle of Wight plant, and their outline is more triangular, but in every other respect—time of appearance of the leaves and of flowering, shape of the spathe, essential organs, and barren pistils—the two are undistinguishable.

Italian Cuckoo-pint.

French, *Gouet d'Italie.*

ORDER LXXVI.—**LEMNACEÆ.**

Small floating submersed herbs, without an ordinary stem or leaves, but consisting of minute leaf-like fronds (internodes of the stem), from the edges of which other and smaller fronds are often produced, sinking to the bottom of the water in winter, where the minute buds of the fronds persist until the succeeding spring, when they rise to the surface, the old ones decaying annually. Flowers produced from the edges or rarely from the upper surface of the frond (very rarely observed in some of the species), enclosed in a minute bract or spathe. Male flowers 1 or 2, reduced to a single naked stamen, with a filiform filament and a 2-celled anther. Female flower solitary, included in the spathe with the 1 or 2 male flowers, reduced to a single naked 1-celled ovary; ovules 1 to 4, or rarely more, inserted at the bottom of the cell; style short; stigma truncate, depressed. Fruit a membranous utricle, indehiscent. Seeds 1 to 4; albumen none.

GENUS I.—**LEMNA.** *Linn.*

The only genus of the order.

The origin of the name of this genus of plants is supposed to be the Greek word λεπίς, a scale; but it is somewhat doubtful as to the meaning of the word.

SECTION I.—STAUROGETON. *Reich.*

Fronds submerged, translucent, at length tailed, each giving rise to a single root-fibre, and furnished with naked lateral clefts from which young fronds are produced, which remain permanently attached to the parent frond; epidermis absent. Flowers from a cleft in the margin of the frond. Ovary containing a single semi-anatropous ovule. Fruit 1-seeded, indehiscent.

SPECIES I.—**LEMNA TRISULCA.** *Linn.*

PLATE MCCCXCIV.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XV. Fig. 18.
Billot, Fl. Gall. et Germ. Exsicc. No. 2384.

Fronds submerged, translucent, thin, flat, elliptical-lanceolate, crenate-serrate towards the apex, the young fronds at length tailed, and attenuated into a stalk, by which they remain attached to the parent frond, each frond giving rise to a single root-fibre.

In ponds and ditches. Rather common, and generally distributed in England. Rare in Scotland, where it is reported only from the counties of Berwick, Roxburgh, Edinburgh, Fife, and Forfar. Local, but widely distributed in Ireland.

England, Scotland, Ireland. Perennial. Spring, early Summer.

Fronds $\frac{1}{4}$ to $\frac{1}{2}$ inch long, not including the tail, which sometimes attains the length of $\frac{1}{2}$ or even $\frac{3}{4}$ inch. The young fronds spring at right angles from the sides of the parent frond, and remain connected with it; from these other fronds are at length given off, so that we have at last a group of fronds, all tailed or stalked, except those last produced. The fronds in this, as in the other species of the genus, are said to be annual, but I have found the old fronds in February: whether they die wholly away before the new fronds attain any size, I am unable to say; but I suspect they do not, and escape observation in winter from lying in the mud at the bottom of the water. The frond, with the young ones proceeding from it, before the stalks of the latter are developed, appears hastate with 3 nearly equal lobes, in which it differs from all the other British species. The flowers I have never seen. They are figured by Reichenbach as coming from clefts situated about the place where the young fronds ought to be given off; i.e. nearer the tailed end of the frond than the apex.

Ivy-leaved Duckweed.

French, *Lenticule prolifère.* German, *Dreifurchige Wasserlinse.*

Although pretty enough to excite general interest, we have nothing to record of the uses of the species of Lemna. Their popular name of Duckweed is given in allusion to the avidity with which ducks devour the tender leaves of which they are composed. It is, however, to the observer, microscope in hand, that they afford the greatest interest. *Lemnaceæ* amongst British plants are eminent for containing in their tissues the minute organs, to which botanists have given the name of *Raphides*. This word is derived from ῥαφίς, the Greek for needle, in allusion to the needle-like form which many of these bodies assume. They are, in fact, the minute crystals of various saline matters, which are taken up into the tissues of plants, and whilst forming a part of the bulk of the living plant, nevertheless obey the lower laws of crystallisation. At one time it was thought that these bodies were accidental, and little attention was paid to their presence or absence in plants. In a paper published in the "Quarterly Journal of Microscopical Science," Dr. Lankester called attention to the constant occurrence of raphides in certain orders of plants, and since then Professor Gulliver has published a series of exhaustive observations on the subject, in which he shows that not only are raphides constantly present in some orders and species of plants, but that they are as persistently absent in others. In a paper on this subject in the "Popular Science Review," vol. iv. he says, "If we examine the cells in the leaves, in fruits which are modifications of leaves, and the stem, fruit, root, and other organs of some of the flowering plants most commonly seen in our walks—say, a willow herb or bedstraw, a loosestrife or honeysuckle—we shall get remarkable results. Indeed, so plain and simple, so significant and beautiful will they prove, that our first feeling may well be one of surprise that such characters have not been long since discovered and usefully realised in descriptive or systematic botany. While we find raphides constantly abounding in the former two plants, in the latter two we shall as constantly find raphides wanting, and this in examples now purposely chosen from neighbouring orders of the 'British Flora.' And having thus, as well as by repeated independent trials, found the constancy and truth of this character, how can we avoid the conviction that to the first two plants Nature has assigned, as an essential and intrinsic function, by a structure of organic cells, the office of raphis-bearing, while to the last plants she has not appointed that same office or structure? And so this will appear to us not merely as an arbitrary or technical distinction, but as a truly regular and natural difference."

Raphides can be easily detected with a compound microscope having a quarter of an inch objective. They are usually transparent and colourless, and of a needle shape, occurring in bundles of from fifteen to twenty in number. They are generally found lying across the oval cells of plants, and frequently project beyond the cell. The cells containing the raphides are usually larger than the surrounding ones which do not contain them. The raphides are not attached to each other, but lie loosely together, and they are frequently observed to escape from the cell under gentle pressure. They vary in size in the same plant, and more in different species and orders. According to Mr. Gulliver's measurements, they vary from the $\frac{1}{25}$ of an inch in length to the $\frac{1}{15000}$ of an inch in breadth. Sometimes raphides present themselves in the form of a prism. They are then not so long in proportion to their breadth, and only a few crystals are found together. Such crystals are found in the species of the genus Iris. Sometimes several of these crystals adhere together by their base, and form a more or less rounded body, and to these the name sphæraphides has been applied. Such crystals have been found in the Elm and Cranesbill, and have had the name cysto-lithes and crystal glands applied to them.

Raphides are composed of various materials. The needle-shaped prisms consist of phosphate of lime, whilst the crystal prisms are composed of oxalate of lime and magnesia; the sphæraphides seem principally composed of oxalate of lime. Other mineral substances, as silica and carbonate of lime, also sulphate of lime, are found in a crystalline form in the tissues of plants; but they do not constitute what are called raphides.

In a paper on "Raphides as Natural Characters in the British Flora," in the volume of the "Quarterly Journal of Microscopical Science" for 1866, Professor Gulliver gives the following summary of the occurrence of raphides in British plants:—

"Only three orders of British Dicotyledons can be as yet characterised as raphis-bearers, and these are Balsamineæ, Onagraceæ, and Rubiaceæ." "In Monocotyledons raphides are much more plentiful than in Dicotyledons, so no wonder that a partial examination should have led to the belief that 'they are abundant in Monocotyledons generally.' This and other such vague and incorrect statements are current in our best and latest treatises of Phytotomy; whereas the truth is, that, however raphides may abound in many Monocotyledons, they are either very scarce or absolutely wanting in several extensive orders of this class. As before mentioned, our indigenous plants are only now under consideration, and we shall soon see that about a fifth part of the 'Manual of British Botany' is occupied by Monocotyledons and Cryptogameæ Ductulosæ, which I have searched in vain for raphides.

"*Dictyogenæ.* —In all our plants of this group raphides are plentiful, and they occur in every one of the exotic members of it that I have examined; only in *Roxburghia* raphides are mostly replaced by crystal prisms. I have found that the beautiful shrub *Lapageria* is also a raphis-bearing plant. In the lineal series of the natural arrangement, the Dictyogenæ stand isolated by this character between Coniferæ and Hydrocharidaceæ, two orders in which it is wanting.

"*Hydrocharidaceæ.*—This order is remarkable as being devoid of the raphidian character, though standing between two groups, Dictyogenæ and Orchidaceæ, in full possession thereof.

"*Orchidaceæ.*—Raphides were found in every plant, British and foreign, that I have examined of this order. They are by no means confined to the sepals, as might be supposed from current descriptions, but are common in the placenta and ovary, in the stem and the leaves, and parts which are modifications of leaves, and in the roots. The raphides are commonly much shorter than their soft pale cells, and may be well seen without disturbing them through the semitransparent edge of the leaf of *Neottia spiralis.*

"*Iridaceæ.*—True raphides are scanty and often not to be detected in this order, but it abounds in crystal prisms. These last occur in all our plants except *Sisyrinchium anceps*, in which, as well as in the exotic *S. Bermudianum*, and *S. striatum*, I have failed to find any such crystals. They are very remarkable in the common garden species of Iris.

"*Amaryllidaceæ.*—In all our Amaryllids raphides occur. They may be well seen in the leaves, scape, ovary, bulb-scales, and bulb, and smaller and less plentiful in the bulb and perianth.

"*Asparagaceæ.*—All our plants of this order are raphis-bearers. This character is common in the root, leaves, perianth, and ovary of *asparagus*, &c., and more remarkable in the perianth than in the leaves of *Ruscus.*

"*Liliaceæ.*—Of the four tribes of this order as they stand in the 'Manual of British Botany'—

"1. *Tulipeæ.* Destitute of raphides.

"2. *Asphodeleæ* with *Gagea* and *Allium.* Also devoid of raphides, though they abound in *Ornithogalum* and *Scilla.*

"3. *Anthericeæ*. Perhaps without raphides, as I could not find them in a dried bit of *Simethis*; while in both plants of

"4. *Hemerocallideæ*, raphides are abundant.

"*Colchicaceæ.*—Excepting a few minute raphis-like objects in the root-fibres, the British plants of this order are quite without raphides. The sphæraphid-tissue occurs in *Tofieldia*; and among the foreign plants *Veratrum* presents beautiful examples of this tissue, and abounds also in raphides.

"*Eriocaulaceæ.*—I could find no raphides in dried leaves of *Eriocaulon septangulare.*

"*Juncaceæ.*—In our indigenous species of *Luzula* and *Juncus* I have in vain searched for raphides. A few small raphides, or objects resembling them, occur in the leaves of *Narthecium.*

"*Alismaceæ.*—Raphides are wanting in our native species, as well as in the few foreign ones that I have examined.

"*Araceæ.*—Raphides abound in *Arum*, but are wanting in *Acorus.* All the exotic *Araceæ* that I have examined are raphis-bearers, and so are all the orders of Professor Lindley's Aral Alliance. As to *Acorus*, it is placed by him in the Juncal Alliance of his 'Vegetable Kingdom,' and as the type of the distinct order *Acoraceæ*, between *Juncaceæ* and *Juncaginaceæ*, among our native plants in his 'School Botany.' And as I have found these last two orders, like *Acorus*, deficient in raphides, an additional reason appears for separating this genus from an order in no species of which have raphides yet been found wanting. I have, however, discovered a few small raphides like those of *Narthecium* in the the exotic *Gymnostachys.*

"*Lemnaceæ.*—Raphides occur in all our plants, more abundantly in *L. minor* and *L. trisulca* than in *L. gibba* and *L. polyrrhiza*, and they are very plentiful, with sphæraphides in the tropical *Pistia Stratiotes.*

"*Potamogetonaceæ*, *Naiadaceæ*, *Cyperaceæ*, *Graminaceæ*, and *Cryptogamia, Ductulosæ.*—In none of these plants, which include and form so large a portion of the 'Manual of British Botany,' have I yet found raphides."

Professor Gulliver claims for the raphides an important character in plants. He thinks that as they invariably are found in one species and not in another, they may fairly be held as specific distinctions, and he says, "I believe that a fair examination will prove that raphides may give a diagnosis at once as fundamental and universal, and as simple as truly natural, between plants of some different and proximate orders as any one of the secondary characters heretofore used for this purpose in systematic botany. That raphides are a true exponent of an essential function of the cell-life is shown by their constancy in certain plants; bearing in mind, too, that the question is not merely one of such saline crystals as have ever yet been made by the act of the chemist. An excellent observer, Mr. Edwin Quekett, thought he formed them artificially. But John Quekett, Payen, and others came to the conclusion that raphides either have an organic basis or pellicle; and certain it is that they commonly occur in bundles, within a living and beautiful cell, the whole forming an organism as inimitable by mere chemistry as a spore or a grain of pollen. We must attach, therefore, a far higher meaning to raphides than would be implied only by the term crystals." Professor Gulliver tells us that an amusing and not uninstructive exception among plants was lately brought under his notice. A friend taking a fragment from a plant in his collecting-box, put it under the microscope, and told him to look and say fairly what he saw. He did so—there were plainly many raphides. He then learned that the plant was a dodder, in which no raphides had ever before been found, nor in any of the genus. Accordingly, some flowers and bits of its stem were again carefully examined, but no raphides could be detected. The plant was at last given to the microscopist, and the friend pointed out a part which he called the scales as the portion at first put under the microscope. These turned out to be no part of the dodder, but the small withered leaves of another plant on which it had become entwined, probably *Sherardia*, and belonging to the raphis-bearing order *Galiaceæ*. Professor Gulliver tells us how he has grown from seed, in one pot of mould, plants known as raphidian and exraphidian, and has been able to pick out each merely by this character as soon as the seed leaves were well grown. "But nature," he says, "requires much further questioning as to the constancy of raphides and their cells, their significance and form, and the conditions under which they may or may not be produced or checked, or modified in quantity or quality. A multiplication of such enquiries would be easy and desirable in different localities, and a pleasant and instructive addition to rural amusements." Professor Gulliver concludes his exhaustive paper by remarking that above half the British monocotyledons appear to be devoid of raphides, and he says, "In truth, how far the raphidian character may prove useful in the revision many of the orders of plants seem to require, remains to be decided, after a careful extension and correction of these observations, especially as regards the 'Flora of the World,' by judicious enquirers, who may have the requisite materials at their command, and the will to use them, for the elucidation of the question of the value of raphides and their cells, as natural characters in systematic botany. Meanwhile, it is hoped that the present observations may induce some of our countrymen to study the subject in their own flora."

Dr. Lankester remarks that the biography of our British plants has yet to be written, microscope in hand, and it is not till the minute details of the cell-life of each plant have been recorded that we shall be in a position to arrive at the laws which govern the life of the vegetable kingdom. And it may be added that, until due attention has been paid to this important subject, we shall never be able to comprehend and realise all the mysterious plans and specifications by which Nature has marked, for our instruction, her own affinities and contrasts, among allied groups of the vegetable kingdom.

SECTION II.—EU-LEMNA.

Fronds floating, herbaceous, not tailed, each giving rise to a single root-fibre, and furnished with naked baso-lateral clefts, from which young fronds are produced, which remain sessile and attached only for a short time to the parent frond; cells of the epidermis bounded by sinuous lines. Flowers from a cleft in the margin of the frond. Ovary containing a single semianatropous ovule. Fruit 1-seeded, indehiscent.

SPECIES II.—**LEMNA MINOR.** *Linn.*

PLATE MCCCXCV.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XIV. Fig. 15.
Billot, Fl. Gall. et Germ. Exsicc. No. 2939.

Fronds floating, opaque, rather thick, flat on both surfaces, oval-obovate or suborbicular, entire, not tailed, subapiculate, the young fronds sessile; each frond giving rise to a single root-fibre, the under-surface not spongy.

In ponds and ditches. Very common, and generally distributed, extending to Orkney, but apparently not to Shetland.

England, Scotland, Ireland. Perennial. Early Summer.

Fronds ⅛ to ¼ inch long, usually rather broader towards the apex, and generally apiculate at the base, bright green above, paler beneath, giving off at the base at an angle young fronds, which are generally unequal in size, and sometimes only on one side; epidermal cells bounded by strongly sinuous lines. The fronds perish in autumn, and the buds remain at the bottom of the water until spring, when they rise to the surface, and rapidly increase in size. The plant, therefore, should no more be called an annual than a tulip or crocus, of which the bulb or corm is annually reproduced. The flowers are extremely minute and produced from a small lateral cleft towards the base of the frond, from which 2 anthers (male flowers), one developed before the other, and a single female flower, reduced to a flaskshaped ovary, with a conspicuous style. The fruit I have not seen.

Lesser Duckweed.

French, *Lenticule naine.* German, *Kleinste Wasserlinse.*

According to Fraas's "Synopsis Plantarum Floræ Classicæ," this species is the *ἴκμη* of Theophrastus (iv. 11), and the *ῥάκος* of Dioscorides (iv. 88).

SECTION III.—TELMATOPHACE. *Schleid.*

Fronds floating, herbaceous, apiculate, not tailed, each giving rise to a single root-fibre, and furnished with naked baso-lateral clefts, from which young fronds are produced, which remain sessile and attached only for a short time to the parent frond; cells of the epidermis bounded by sinuous lines. Flowers from a cleft in the margin of the frond. Ovary containing 2 to 7 anatropous ovules. Fruit 2- to 7-seeded, bursting transversely.

SPECIES III.—**LEMNA GIBBA.** *Linn.*

PLATE MCCCXCVI.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XIV. Fig. 16.
Billot, Fl. Gall. et Germ. Exsicc. No. 2940.
Telmatophace gibba, *Schleid.* *Kunth.* Enum. Pl. Vol. III. p. 6.

Fronds floating, opaque, thick, flat above, at length very convex beneath, oval-obovate or suborbicular, entire, not tailed, subapiculate, the young fronds sessile, each frond giving rise to a single root-fibre, the under surface at length spongy and greatly swollen.

In ditches and ponds. Rather local, but generally distributed in

England. Rare in Scotland, where I have found it in Lochend and Duddingston Loch, near Edinburgh; and in Loch Gelly, Fife. Rare and local in Ireland, where it is found about Limerick, and some places in the east and north of the island.

England, Scotland, Ireland. Perennial. Early Summer.

Very similar to L. minor, but larger when full grown, being usually about ¼ inch long or even more, and usually with longer roots, but the most striking difference is the convexity of the under surface, on which a quantity of loose spongy tissue is developed so as to make a section of the frond nearly semicircular. The flowers I have never seen.

Gibbous Duckweed.

French, *Lenticule gonflée.* German, *Buckelige Wasserlinse.*

SECTION IV.—SPIRODELA.

Fronds floating, herbaceous, not apiculate or tailed, each giving rise to a tuft of numerous root-fibres, furnished with membranous-edged baso-lateral clefts from which young fronds are produced, which remain sessile and attached only for a short time to the parent frond; cells of the epidermis bounded by sinuous lines. Flowers from a cleft in the margin of the frond (?). Ovary with 2 ovules. Fruit unknown.

SPECIES IV.—**LEMNA POLYRRHIZA.** *Linn.*

PLATE MCCCXCVII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XV. Fig 17.
Billot, Fl. Gall. et Germ. Exsicc. No. 2941.
Spirodela polyrrhiza, *Schleid. Kunth.* Enum. Pl. Vol. III. p. 7.

Fronds floating, opaque, thick, flat above, very slightly convex beneath, suborbicular, entire, not tailed, not apiculate, marked with numerous veins diverging from the point where the roots are produced; the young fronds sessile, each frond giving rise to a tuft of root-fibres; the under side without spongy tissue.

In ponds and ditches. Not uncommon, and generally distributed in England, reaching northward to York and Lancashire. Formerly found at Duddingston Loch, near Edinburgh, from whence I have seen specimens collected by Dr. Philip Maclagan, but where I have never succeeded in finding the plant. Mr. H. C. Watson gives the west lowland province as one in which it occurs, but I am unable to say in which of the three counties, viz. Ayr, Renfrew, or Lanark, it has been seen. Rare, and local in Ireland, where it occurs about Limerick, Dublin, Westmeath, and Mullingar.

England, Scotland, Ireland. Perennial. Flowers not known in Britain.

Fronds $\frac{1}{4}$ to $\frac{5}{8}$ inch across, more orbicular than many of the preceding species, bright green above, generally purple beneath, with a tuft of numerous roots from a point towards the base of the frond, from which point radiate a number of veins containing spiral fibres. The flowers have never occurred in Britain or France, and seem to be very little known. Reichenbach figures them as coming from the upper side of the frond. Lamarck, who is probably right, represents them as produced from a lateral cleft near the base. Both these figures have been copied on our Plate MCCCXCVII.

Greater Duckweed.

French, *Lenticule à plusieurs racines.* German, *Vielwurzelige Wasserlinse.*

SECTION V.—WOLFFIA. *Horkel.*

Fronds floating, herbaceous, not tailed, wholly destitute of root-fibres, and furnished with a membranous-edged basal cleft from which the young frond is produced, which remains sessile and attached for a short time to the parent frond; cells of the epidermis bounded by straight lines. Flowers from a pit on the upper surface of the frond. Ovary containing a single erect ovule. Fruit indehiscent, 1-seeded.

SPECIES V.—**LEMNA ARRHIZA.** *Linn.*

PLATE MCCCXCVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XIV. Fig. 14.
Billot, Fl. Gall. et Germ. Exsicc. No. 3478.
Wolffia arrhiza, *Wimm.* *Coss. & Germ.* Fl. de Par. ed. ii. p. 716. *Welwitsch* in *Seemann's* Journ. Bot. 1865, p. 113. *Trimen* in *Seemann's* Journ. Bot. 1866, p. 220.
Wolffia Michelii, *Schleid.* Beitr. z. Bot. Vol. I. p. 233.
Bruniera vivipara, *Franchet*, in Billotia, Vol. I. p. 25.

Fronds opaque, floating, cylindrico-convex above, and more so beneath, oval-oblong, entire, not apiculate or tailed at the base, destitute of roots; the under side with spongy tissue. Young fronds solitary and sessile from the very base of the parent frond.

Discovered in a pond near the railway station at Staines, Middlesex, by Dr. H. Trimen, in June, 1866, and afterwards near Walthamstow, Essex, by Mr. Traherne Moggridge.

England. Perennial. Flowers unknown in Britain.

Fronds very minute, $\frac{1}{20}$ inch long by about half as broad, differing from all the other species in having no roots, and the bud bursting from the base of the parent frond.

The flowers have never been found in Europe, but were observed in abundance in Africa by Dr. Welwitsch, whose drawings have been copied on our plate, by permission of Dr. Seemann. The magnified figures of the barren plant are from sketches taken by Dr. Trimen.*

Rootless Duckweed.

German, *Wurzellose*

ORDER LXXVII.—**NAIADACEÆ**

Perennial or more rarely annual aquatic herbs, submerged, sometimes with the uppermost leaves floating or rising above the water, which the flowers also usually do at the time the pollen is shed. Rootstock often creeping, slender, rarely with tuberous enlargements. Stem more or less elongated. Leaves alternate, rarely all, or more often the upper ones opposite, usually entire, stalked or sessile or sheathing at the base, with parallel or cancellate venation. Stipules often amplexicaul, rarely absent. Flowers perfect or unisexual, in the latter case monœcious, rarely diœcious, sometimes arranged on a spadix, sometimes solitary or crowded in the axils of the leaves. Perfect flowers with a subherbaceous 4-leaved perianth, or naked. Male flowers usually destitute of perianth, but sometimes of 3 or 4 scale-like perianth segments. Female flowers without a perianth, or with a campanulate membranous perianth. Stamens 1, 2, or 4; anthers 1- or 2- rarely 4-celled, frequently sessile or subsessile. Ovary free from the perianth, of 2 or 4 distinct carpels (rarely of 1, 3, 5 or 6 carpels), each carpel with a single ovule and a separate stigma, or if a single carpel with 1 ovule, and generally with 2, 3, or 4 stigmas. Fruit of as many small indehiscent often subdrupaceous nuts as there are carpels, each nut containing a single seed. Seed with a thin testa; albumen none; embryo strait or hooked; radicle pointing towards the hilum or away from it.

GENUS I.—**POTAMOGETON.** *Linn.*

Flowers numerous, perfect, sessile, disposed all round a stalked axillary or terminal stalked spadix, issuing from a sheathing bract. Perianth single, of 4 herbaceous leaves (sepals) with short claws. Stamens 4, inserted in the claw of the perianth leaves; filaments very short; anthers 2-celled. Ovary free, of four separate 1-celled and 1-ovuled carpels, rarely reduced to 1 carpel; stigmas subsessile or on a short style, undivided. Fruit of 4 subdrupaceous achenes, or of fewer by abortion.

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* It is necessary to state that the sketches of Lemna arrhiza, sent to Mr. Sowerby by Dr. H. Trimen, were merely rough sketches, not detailed drawings. Unfortunately the plate was not submitted to Dr. Trimen's inspection before printing, as he requested it to be, so that he must not be considered responsible for the plate as it appears in this work.—Ed.

Herbs growing in fresh or brackish water, with submerged translucent leaves with cancellate, more rarely parallel venation, sometimes with the upper leaves floating and more or less coriaceous.

The derivation of the name of this genus of plants is from ποταμός, river, and γείτων, neighbour, because it grows in or near rivers.

SECTION I.—PLANTAGINIFOLIA

Leaves all oblong or elliptical or oval, translucent, alternate, and submerged, or the upper ones opposite and sometimes floating and coriaceous, with involute vernation, with ribs connected by cross veins. Stipules free from the leaves or leaf-stalks. Peduncles axillary or terminal. Spikes many-flowered, more or less elongate, dense.

SUB-SECTION I.—NATANTES.

Stem simple or slightly branched towards the apex, without barren branches from the lower part of the flowering stems. Upper leaves stalked, coriaceous or subcoriaceous, rarely membranous or translucent. Peduncles axillary.

SPECIES I.—**POTAMOGETON NATANS.** *Linn. Auct.*

PLATE MCCCXCIX.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. L. Fig. 89.
Billot, Fl. Gall. et Germ. Exsicc. No. 2381.

Stems round, simple or nearly so. Lower leaves alternate, submerged, linear, chanelled, opaque, with numerous longitudinal ribs; upper leaves floating, mostly alternate, stalked, oblong-oval or oval, subcordate or rounded at the base, coriaceous, the coriaceous texture extending a short distance down the petiole, with numerous ribs connected by transverse veins which are indistinct if the dried leaf is held against the light. Stipules very large, fibro-scarious, not winged on the back. Peduncles axillary, rather thick, not enlarged upwards. Sepals with their lamina roundish-rhomboidal. Fruiting-spike cylindrical, many-flowered, dense. Fruit* olive, large, roundish-obovate, slightly compressed, convex on the upper margin, semicircular and keeled on the lower, with a short beak forming a continuation of the upper margin.

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* In this order it is the dried fruit which is described.

Submerged leaves bright green, floating leaves dull green, often purple beneath.

In ponds and ditches. Common, and generally distributed in England. Rather local in Scotland, where it appears to be absent from the extreme north. Common and generally distributed in Ireland.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Rootstock extensively creeping, and sending up stems varying in length according to the depth of water in which the plant grows, which is rarely less than one or two feet and often greater. Submerged leaves resembling the petioles of the floating leaves, channeled above; floating leaves 2 to 4 inches long, differing from those of all the British Potamogetons in having the coriaceous substance continued a little way down the petiole, with a fold at the base, which, when the leaf is pressed flat, forms a ridge on each side of the midrib. When held against the light, the transverse veins are visible, but not distinctly so, on account of the thickness of the substance of the leaf. Stipules scarious, those of the upper leaves very long, at length fibrous, from the decay of the tissue connecting their ribs. Peduncle usually about as long as the spike, stout. Fruiting spike 1½ to 3 inches long. Fruit nearly ¼ inch long, when fresh greenish-olive, obtuse on the back until it dries, when a keel is developed.

Koch and Grenier say that before flowering the submerged leaves have a narrow lamina, which decays by the middle of May. I have never seen this, though I have looked for such leaves at all seasons.

Floating Pondweed.

French, *Potamot nageant.* German, *Schwimmendes Saamkrautgewächse.*

SPECIES II.—**POTAMOGETON POLYGONIFOLIUS.** *Pourret.*

PLATE MCCCC.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XLIV. Figs. 79 and 80.

P. oblongus, *Viv.* *Bab.* in Engl. Bot. Sup. No. 2849. *Fries*, Summ. Veg. Scand. pp. 68 (67), and 213. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 775.

Stems round, simple or nearly so. Lower leaves alternate, submerged, shortly stalked, oblanceolate or elliptical or strapshaped-elliptical and membranous—or longly-stalked, subcoriaceous, rising out of the water, and oblong-ovate or oval; uppermost leaves opposite, floating or rising out of the water, of the same texture as the whole of the rather short petiole, oval or oblong or elliptical, subcoriaceous, with numerous longitudinal ribs connected by cross veins, which are very conspicuous if the dried leaf be held against the light, when minute areolation is scarcely perceptible all over the leaf between the veins. Stipules large, not winged on the back, subfibro-scarious. Peduncles axillary, slender, not enlarged upwards. Sepals with their lamina rhombic-roundish. Fruiting-spike cylindrical, many-flowered, dense. Fruit reddish, small, roundish-obovate, slightly compressed, convex on the upper margin, semicircular and slightly keeled on the back, with a short terminal beak. Leaves dull olive-green, often tinged with reddish-brown.

Var. α, *genuinus.*

PLATE MCCCC.

Lowest leaves narrower and thinner in texture than the upper ones, which are rounded or subcordate at the base.

Var. β, *pseudo-fluitans.*

Lower leaves membranous, elliptical-strapshaped, attenuated at each end; floating leaves subcoriaceous, gradually attenuated into the petiole.

Var. γ, *ericetorum.*

Leaves all similar, subcoriaceous, floating or rising out of the water, longly-stalked, with an oval or oblong-oval or roundish lamina.

Var. α in shallow water. Var. β in deep water, Dunsappie Loch, Edinburgh; Buttermere (Professor Oliver). Var. γ in wet places, chiefly on heaths, where it is extremely abundant, and generally distributed. The distribution of vars. α and β I am unable to give.

England, Scotland, Ireland. Perennial. Summer, Autumn.

A very variable plant, with the stems rarely above a span long, as deep-water forms appear to be rare. The leaves are very variable in shape, and in many cases can only be distinguished from those of P. natans by being less coriaceous and not having the substance of the leaf continued for some distance down the petiole ; the lamina, however, is generally smaller, commonly about 1½ inch long, and there are no grasslike petioles destitute of lamina, which are the only submerged leaves present in P. natans at the time of flowering. The lower leaves have a broad lamina, like the others, only usually more attenuated at the base, and of more membranous texture. The stipules are large, as in P. natans, but much less persistent, as the fibres which form their ribs are less tough. The peduncles are much more slender, the spike shorter, rarely above 1 inch long. The fruit is only about $\frac{1}{10}$ or $\frac{1}{12}$ inch long, and reddish when ripe.

Var. β very closely resembles the true P. fluitans, having long narrow pellucid submerged leaves, attenuated at each end, and the floating leaves are narrowed at the base. The shape of the sepals, however, is rounder than in the true P. fluitans, which has the fruit the size of P. natans.

Var. γ is found on almost every heath, and is the commonest form of Potamogeton in the whole country, extending north to Orkney. This has the leaves all similar, and often grows in mud without any water.

In Glen Devon, near Dollar, I have found a form near var. γ, with the upper leaves nearly round, and deeply cordate at the base, and with larger, blunter, and more membranous stipules than in the ordinary form.

Oblong-leaved Pondweed.

German, *Längliches Samkrautgewächse.*

SPECIES III.—**POTAMOGETON PLANTAGINEUS.** *Ducros.*

PLATE MCCCCI.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XLV. and XLVI. Figs. 82 to 85.
Billot, Fl. Gall. et Germ. Exsicc. No. 651.
P. coloratus, *Wallr.* *Fries*, Summ. Veg. Scand. p. 68 (67).
P. Hornemanni, *Meyer.* *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 777.

Stems round, simple or nearly so. Lower leaves alternate, submerged, very shortly stalked, oblanceolate or oval, on rather long stalks and abruptly attenuated into the petiole; upper leaves opposite, rising out of the water, oval or ovate-oval or roundish-oval, frequently subcordate at the base; all pellucid and membranous, with numerous longitudinal ribs connected by transverse veins, which are very conspicuous if the dried leaf be held against the light, when the rather minute areolation is clearly perceptible all over the leaf between the ribs. Stipules large, blunt, not winged on the back, scarious. Peduncles axillary, slender, not enlarged towards the apex. Sepals with their lamina roundish-rhombic. Fruiting-spike cylindrical, many-flowered, dense. Fruit green, very small, semicircular-ovoid, compressed, nearly straight on the upper margin, semicircular and faintly keeled on the back, with a short beak forming a continuation of the upper margin. Young leaves bright grass-green, older ones olive.

In shallow pools and ditches. Local, but widely distributed, especially in fenny districts. In Scotland I have only found it in Guillon Ponds, Haddingtonshire; but it occurs also near Berwick, and at Oban in Argyleshire. Rather rare, but generally distributed in Ireland.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Very similar in habit to P. polygonifolius; but the lower leaves are less distinctly stalked, and the upper ones have the lamina gradually or suddenly contracted into the petiole, which is slightly enlarged towards the apex, and not of uniform width, as in P. polygonifolius; the lamina of all the leaves, when held against the light, shows a delicate areolation between the veins, the cells being largest along the sides of the ribs. The fruit is about $\frac{1}{16}$ inch long, considerably smaller than in the last species, green, not red, with the upper margin straighter, and terminated by the beak, which in P. polygonifolius is situated more nearly in a prolongation of the axis of the fruit. In both P. polygonifolius and P. plantagineus the fruit is marked with a lateral ridge on each side of the keel.

The leaves vary in breadth, as in P. polygonifolius: in some Guernsey specimens they are suborbicular.

Plantain-leaved Pondweed.

French, *Potamot plantain.* German, *Wegebreitblätteriges Samkraut.*

SPECIES IV.—POLYGONUM RUFESCENS. *Schrad.*

PLATE MCCCCII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXXII. Fig. 56 to 58.
Billot, Fl. Gall. et Germ. Exsicc. No. 650.
P. fluitans. *Sm.* Engl. Bot. ed. i. No. 1866 (non *Roth.*).
P. alpinus, *Balb.* *Crep.* Man. Fl. Belg. ed. ii. p. 302.

Stems round, simple or nearly so. Lower leaves alternate, submerged, sessile, strapshaped-elliptical, or oblong-elliptical, attenuated at the base and apex, not denticulate, translucent, with numerous faint longitudinal ribs connected by transverse veins, and with several rows of large cancellate areolations along the midrib; upper leaves opposite, floating or rising out of the water, stalked, oblanceolate or obovate or obovate-elliptical, gradually attenuated into the short petiole at the base, subcoriaceous, of the same texture as the petiole, with the ribs and cross veins rather conspicuous if held against the light, when minute areolation is indistinctly perceptible all over the leaf between the ribs: more rarely the upper leaves are submerged, pellucid, and similar to the lower ones in shape and texture, or in some intermediate state between this and that previously described. Stipules large, blunt, not winged on the back, scarious. Peduncles axillary, rather slender, not enlarged towards the apex. Sepals with their lamina roundish. Fruiting-spike oblong-cylindrical or cylindrical, many-flowered, dense. Fruit reddish-fawn colour, rather small, oval-ovoid, acuminated at the apex, very convex on the upper margin, semicircular, and sharply keeled on the back, with a rather prominent recurved subterminal beak. Plant tinged with reddish-brown, especially when dry.

Var. *α*, *genuinus.*

Lower leaves pellucid; upper leaves subcoriaceous, floating.

Var. β, *homophyllus*.

Leaves all pellucid, none of them floating.

In ditches and slow streams or pools. Rather local, but generally distributed. It is, however, doubtful if it extends to the extreme north of Scotland. Rather rare in Ireland, but occurring from south to north of the island.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Stems springing at intervals from the creeping rootstock, simple, 6 inches to 3 feet long. Lower leaves 3 to 6 inches long; lamina of the upper or floating leaves 1½ to 3 inches long. Fruiting spike ¾ to 2 inches long, usually much shorter than the peduncle.

The acuminated fruit, scarcely at all compressed on the sides, distinguishes P. rufescens from the deep-water forms of P. polygonifolius, in which also the lower leaves are more attenuated towards the base and smaller, the upper ones not attenuated into the petioles, and more coriaceous, the petioles much longer, and the whole plant is less tinged with reddish-brown than in P. rufescens.

Reddish Pondweed.

French, *Potamot roussâtre.* German, *Röthliches Samkraut.*

SUB-SECTION II.—LUCENTES.

Stem branched, the flowering stem giving off barren branches in its lower part. Peduncles axillary or terminal.

SPECIES (?) V.—**POTAMOGETON "SPARGANIIFOLIUS."** *Bab.*

PLATE MCCCCIII.

Bab. Man. Brit. Bot. ed. vi. p. 363 (*ex parte*) (non *Läst.!* nec *Fries!*).
P. Kirkii, *mihi*, MS.

Stems round, much branched; the lower branches barren. Leaves mostly alternate, submerged, sessile, very long, linear, attenuated at the base, and more abruptly so at the apex, not denticulate, translucent, with numerous longitudinal ribs connected by few and distant transverse veins, and with several rows of greatly elongate-cancellate areolations along the midrib; upper leaves sometimes floating, longly stalked, elliptical or oblong-elliptical, gradually or the upper ones more abruptly attenuated into the long petiole at the base, subcoriaceous, of the same texture as the petiole, with the ribs and cross veins conspicuous if the dried leaf be held against the light, when minute areolation is indistinctly perceptible all over the leaf between the ribs: often the upper leaves are submerged and pellucid, and similar to the lower ones in shape and texture, or of some intermediate form between this and that previously described. Stipules very long, blunt, not winged on the back, scarious, with numerous fibres. Peduncles axillary, long, rather slender, not enlarged towards the apex. Fruit unknown. Plant (when dried) dull green; the floating leaves tinged with reddish-brown.

Found by Mr. Thomas Kirk in the Ballinabrack river at Ma'am, co. Galway.

Ireland. Perennial. Summer, Autumn.

A very puzzling plant, differing from any described species, though I have some suspicion that it may be a very luxuriant abnormal form of P. polygonifolius, growing in deep running water, but, unfortunately, I have not been able to examine fresh specimens: the chief difficulty of combining it with P. polygonifolius exists in the branching of the stem which connects it with the heterophyllus group. The large stipules indicate an affinity with P. natans, but they have the fibres less numerous and not so strong, and the apex much less acute; the floating leaves are 2 to 4 inches long, and very closely resemble those of P. polygonifolius, var. pseudo-fluitans, but the submerged leaves are much longer, often 1 foot or more by ¼ to ⅜ inch broad, with more closer longitudinal and no apparent petiole, and are not narrowed at the base into an evident petiole. I have seen but one specimen in flower which is in Mr. Borrer's herbarium; the peduncle and spike closely resemble that of P. polygonifolius, var. pseudo-fluitans.

Professor Babington refers this to P. sparganiifolius of Lästadius and Fries, but I have compared it with authentic specimens of this plant from both these botanists in the Kew Herbarium, and cannot agree with his conclusion. The stem of the true P. sparganiifolius is, as described by Fries, perfectly simple, and the leaves bright grass green when dried: these specimens are without floating leaves, so I cannot compare them with those of the Irish plant; but Fries says that floating leaves, though sometimes deficient, are however necessary, as the plant, when destitute of them, is always sterile. The flowering specimen of the Galway plant in Mr. Borrer's herbarium is destitute of floating leaves.

I have seen too little of the Irish plant to venture to affirm it to be specifically distinct from P. polygonifolius, so that, though convinced it is not the P. sparganiifolius of Lästadius, I keep it under this name for the present, though much tempted to designate it P. Kirkii, after its discoverer.

Ribbon-leaved Pondweed.

SPECIES (?) VI.—POTAMOGETON LONCHITIS. *Tuck.*

PLATE MCCCCIV.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXXI. Fig. 55.
Gray, Man. Bot. of the N. U. S. ed. v. p. 486.
P. salicifolius, *Wolfgang; Fries*, Summ. Veg. Scand. pp. 68 (67) and 215 (?). *Hartm.* Skand. Fl. ed. ix. p. 243 (?).
P. lanceolatus, *Reich.* l. c. p. 19 (?) (non *Smith*).
P. sparganiifolius (*ex parte*), *Bab.* Man. Brit. Bot. ed. vi. p. 363.

Stem wiry, much branched; the lower branches barren. Leaves mostly alternate, submerged, sessile and semi-amplexicaul, not recurved, rather long, strapshaped or oblong-strapshaped, rather abruptly attenuated at each end, slightly undulated, not denticulate, translucent, with 7 or 9 longitudinal ribs connected by rather numerous transverse veins, and with several rows of greatly elongated cancellate areolations along the midrib; upper leaves opposite, sometimes floating, longly stalked, elliptical or oblong-elliptical, rounded or abruptly attenuated into the very long petiole at the base, subcoriaceous, of the same texture as the petiole, with the numerous ribs and cross veins conspicuous if the dried leaf be held against the light, when also rather large areolation is very distinctly perceptible all over the leaf between the ribs: often the upper leaves are submerged, pellucid, and similar to the lower ones in shape and texture. Stipules rather long, subacute, not winged on the back, scarious, with few fibres. Peduncles (always?) axillary, rather long and slender, very slightly thickened towards the apex. Spike cylindrical, rather short. Fruit (of the British plant) unknown. Plant with the submerged leaves turning olive when dry; floating leaves green.

In the river Boyne, below Navan, Dr. D. Moore.

Ireland. Perennial. Summer, Autumn.

Stem more slender than in any of the preceding species, resembling that of P. heterophyllus. Leaves 2 to 5 inches long by $\frac{3}{8}$ to $\frac{5}{8}$ inch broad, clasping about one-fourth of the stem; floating leaves 2 inches or more long, resembling those of P. heterophyllus, but thinner in texture. Stipules $\frac{1}{2}$ to 1 inch long, similar to those of P. heterophyllus.

This plant comes very near P. heterophyllus, but the leaves are more parallel-sided, less attenuated towards the base, and straighter, less undulated, and more flaccid; the floating ones thinner and with much larger and more conspicuous areolation, and with the margins at the base involute until they are nearly full grown as in P. polygonifolius, P. natans, and P. plantagineus, while in P. heterophyllus they become flat long before they have attained their full size; the upper stipules are much narrower than in P. heterophyllus; the peduncles also are much longer and more slender and much less thickened towards the apex.

The plant from the Boyne agrees perfectly with North American specimens of P. Lonchitis, *Tuckerman*, in the Herbarium of the late M. Gay, at Kew; but I suspect this is the same as P. salicifolius, *Wolfgang*, of which I have not seen specimens. C. J. Hartmann describes a form of P. salicifolius with floating leaves, which Fries and Reichenbach do not seem to have met with.

Willow-leaved Pondweed.

SPECIES VII.—POTAMOGETON LANCEOLATUS. *Sm.*

PLATE MCCCCV.

P. nigrescens (?), *Fries*, Mant. iii. p. 17, Summ. Veg. Scand. pp. 68 (67) and 214 (ex descrip. non Herb. Norm.).

Stem filiform, fragile, much branched, the lower branches barren. Leaves mostly alternate, submerged, sessile, scarcely at all amplexicaul, not recurved, rather short, strapshaped, rather abruptly attenuated at each end, flat, not undulated, not denticulate, translucent, with 3 or 5 longitudinal ribs connected by few transverse veins, and with several rows of greatly elongated cancellate areolations along the midrib; upper leaves opposite, sometimes floating, but even then scarcely stalked, oblanceolate or oblanceolate-strapshaped, gradually attenuated towards the base, subcoriaceous or translucent, of the same texture as the very short petiole, with 7 or 9 ribs, and numerous cross veins, which are conspicuous if the leaf be held against the light, when also small areolation is very distinctly perceptible all over the leaf, with larger areolations along each of the ribs: often the upper leaves are similar to the lower, except that they are broader, and more narrowed towards the base. Stipules free from the petiole, small, narrow, acute, not winged on the back, scarious, with few fibres. Peduncles (always?) axillary, rather short, not thickened towards the apex. Spike ovoid-oblong, very short. Sepals with their lamina rhombic-orbicular. Nuts unknown (?)—"keeled with faint lateral ridges" (*Bab.*).* Plant dark green, often turning blackish in drying.

In the river Lligwy between Bodafon and Lligwy, Anglesea. Smith says it was sent him from lakes in North Wales by the Rev. H. Davies, probably from the station mentioned above.

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* I do not know whether the fruit described by Professor Babington is that of the Anglesea plant, which alone belongs to this species.

England. Perennial. Autumn.

A small slender plant 9 to 18 inches long. Leaves rarely above 1½ to 2 inches long, the lower ones bearing considerable resemblance to those of P. acutifolius, the upper to those of P. rufescens in miniature. Peduncles ½ to 2 inches long, slender. Head of flowers rarely so much as ¼ inch long. Although Mr. F. M. Webb was kind enough to send me numerous fresh specimens of this plant from Anglesea, gathered as late in the year as September, I have never seen the fruit, as all Mr. Webb's specimens were in flower.

A very distinct species, which has been called in question, from the Anglesea plant being combined with forms of P. heterophyllus, P. nitens, and P. polygonifolius. Smith appears to have really known the plant, though he has erroneously given two Scotch localities on the authority of Hooker's "Flora Scotica."

Lanceolate Pondweed.

SPECIES VIII.—**POTAMOGETON HETEROPHYLLUS.** *Schreb.*

PLATE MCCCCVI.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tabs. XLI. XLII. XLIII. Figs. 71 to 78.
Billot, Fl. Gall. et Germ. Exsicc. No. 1066.
P. gramineus, *Fries.* Mant. i. p. 36, and Summ. Veg. Scand. 68 (67). *Koch.* Syn. Fl. Germ. et Helv. ed. ii. p. 777. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 314. *Crep.* Man. Fl. Belg. ed. ii. p. 302 (non *Linn.* Sp. Pl. nec Herb. !).

Stem wiry, much branched, the lower branches barren. Leaves mostly alternate, submerged, sessile, not at all amplexicaul, spreading or very slightly recurved, nearly flat, short, elliptical-strapshaped or oblong-strapshaped, rather gradually attenuated at each end, often more or less undulated, not denticulate at the margins, translucent, with 7 to 11 longitudinal ribs connected by numerous oblique veins, and with several rows of rather elongate-cancellate areolations along the sides of the midrib ; upper leaves opposite, sometimes floating, and then with long petioles, oval or oblong-elliptical, rounded or abrupt at the base, rarely attenuated into the petiole, coriaceous, of the same texture as the petiole, with numerous longitudinal ribs connected by numerous cross veins, which are indistinctly perceptible if the leaf be held against the light, when also the small areolation is indistinctly perceptible distributed equally over all the leaf : sometimes the upper leaves are translucent and subsessile, and similar to the lower ones, except that they are more narrowed towards the base. Stipules small, except the upper ones, which are broad, acute, not winged on the back, scarcely scarious, except at the edges, and with numerous strong longitudinal fibres. Peduncles axillary and terminal, rather short, stout, thickened towards the apex in fruit. Sepals with their lamina rhombic-orbicular. Fruiting-spike dense, oblong-cylindrical, many-flowered. Nuts green, rather large, acuminated, slightly compressed, nearly straight along the upper margin, semicircular and 3-keeled on the back, terminated by a short beak, forming a continuation of the upper margin. Plant dull green or olive, retaining its colour when dried; the floating leaves bright green, or tinged with reddish.

In pools and lakes. Local, but widely distributed, extending from the south of England to Orkney and Shetland, though wanting in many counties. Not unfrequent in Ireland.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Stem 2 to 4 feet long, with very numerous rather short barren branches below, and at length producing stolons from the axils of the lower leaves. Submerged leaves widely channeled; those of the main stem 1 to 3 inches long, those of the branches generally much smaller. Stipules sometimes with two of the ribs stronger than the other, but quite as often with them all nearly equal. Floating leaves 1 to 2½ inches long, very similar to those of P. polygonifolius, but rather more coriaceous, and quite flat before they have attained their full size, while in P. polygonifolius they remain rolled up into a funnel until they are almost full grown: in some localities, however, floating leaves are never produced. Peduncles 1 to 3 inches long, thick, and enlarged at the apex below the spike—greatly so when in fruit. Fruit spikes ¾ to 1½ inch long. Fruit about ⅛ inch long.

Various-leaved Pondweed.

German, *Grasartiges Samkraut.*

SPECIES IX.—**POTAMOGETON NITENS.** *Web.*

PLATE MCCCCVII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXXIV. Figs. 60 to 62.
D. Moore, in *Seemann's* Journ. Bot. 1864, p. 325.

Stems rather slender, sparingly branched, the lower branches barren. Leaves almost all alternate and submerged, sessile and semi-amplexicaul, spreading-recurved, more or less folded longitudinally, short, oblong-lanceolate or strapshaped-lanceolate, rounded at the base, acute, more or less undulated but not serrate at the margins, translucent, with 7 to 15 longitudinal ribs connected by numerous transverse veins, with a narrow band of very elongate areolations along the sides of the midrib; upper leaves (in the British plant) translucent, opposite, submerged and similar to the lower leaves or oblanceolate, often much narrowed at the base, though not distinctly stalked (in continental specimens they are said to be oblong-lanceolate, contracted into a petiole, and coriaceous. *Gren. & Godr.*). Stipules small, except the upper ones, which are rather large, acute, not winged on the back, scarious with numerous strong longitudinal fibres. Peduncles axillary and terminal, rather short, moderately stout, very slightly thickened towards the apex when in fruit. Sepals with their lamina transversely roundish-rhombic. Fruiting-spike dense, oblong, rather few-flowered. Nuts olive, small, acuminated, slightly compressed, nearly straight along the upper margin, semicircular and 3-keeled on the back, terminated by a short beak forming a continuation of the upper margin. Plant olive dull green, turning darker when dry; the leaves somewhat shining.

In lakes and rivers. Rare. First recorded as British from specimens found in a large lake a short distance from the sea, at Castle Gregory, near Brandon Mountain, co. Kerry, from whence I have been favoured with fresh examples by Dr. D. Moore; Askog Loch, Isle of Bute (Mr. G. E. Hunt); River Tay, near Perth (Mr. John Sim); Loch Lee, Nairn (Mr. W. Stables); Coltfield, Elgin (Mr. Wilson of Alves).

Scotland, Ireland. Perennial. Late Summer, Autumn.

Stems 1 to 2 feet long, thicker and much less branched than in P. heterophyllus, from which it also differs, at least judging from Dr. Moore's specimens, collected in September 1866, by sending forth in autumn from the axils even of the upper leaves numerous slender stolons similar to those of Epilobium obscurum: I have not seen stolons from the uppermost leaves in any other British Potamogeton. The leaves are intermediate in appearance between those of P. heterophyllus and the long-leaved form of P. perfoliatus, and those on the main stem are 1½ to 3 inches long, folded so as to have a gutter in the middle, and more or less curved backwards. Peduncles 1 to 3 inches long, less thickened upwards than in P. heterophyllus, although they are so to some extent, when in fruit. Fruiting-spike ½ to ¾ inch long. Fruit considerably smaller than that of P. heterophyllus, and in Dr. D. Moore's specimens of a yellowish-olive.

I have not seen either British or European specimens with coriaceous floating leaves, but I have some continental examples with the upper leaves oval, attenuated at each end, and shortly stalked, though their texture is similar to that of the lower ones. There is no doubt, however, that the plant sometimes produces coriaceous floating leaves, like those of the preceding species.

Shining Pondweed.

German, *Glänzendes Samkraut.*

SPECIES X.—POTAMOGETON LUCENS. *Linn.*

PLATES MCCCCVIII. MCCCCIX.

Stems stout, sparingly branched, the lower branches barren. Leaves almost all alternate and submerged, indistinctly stalked or subsessile, but not at all amplexicaul, ascending, flat, long, oblong-oval or -elliptical or -obovate, narrowed into a more or less distinct petiole at the base, acute or obtuse and apiculate or mucronate or with the midrib excurrent, not hooded, more or less undulated and irregularly finely serrate at the margins, especially towards the apex, translucent, with 11 to 17 longitudinal ribs connected by numerous transverse veins,and with a narrow band of elongate cancellate areolation along the sides of the midrib; upper leaves opposite, similar to the lower ones, or more rarely stalked, floating, and of rather firmer texture, but never (?) coriaceous. Stipules large, blunt, 2-winged on the back, subscarious, with numerous strong longitudinal fibres. Peduncles terminal and axillary, rather short, very stout, thicker than the stem, slightly thickened towards the apex in fruit. Sepals with their lamina transversely roundish-rhombic. Fruiting-spike dense, cylindrical, many-flowered. Nuts olive, large, slightly acuminated, scarcely compressed, nearly straight along the upper margin, semicircular and not decidedly keeled on the back, terminated by a short beak forming a continuation of the upper margin. Plant bright green or olive, retaining its colour when dry; the leaves somewhat shining.

Var. *α*, *genuinus.*

PLATE MCCCCVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXXVI. Fig. 64.
Billot, Fl. Gall. et Germ. Exsicc. No. 2382.
P. lucens, *Auct. Plur.*

Leaves distinctly stalked, apiculate or shortly mucronate, serrulate at the margins. Peduncles about as long as the spikes or not more than twice as long.

Var. *β*, *acuminatus.*

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XI. Fig. 69.
P. acuminatus, *Schum.* "Enum. Fl. Saelland, vol. i. p. 49." } Teste *Reich.* l. c. p. 23.
P. cornutum, "*Presl.* Fl. Cech. p. 37." }

Leaves distinctly stalked, elliptical or strapshaped-elliptical or strapshaped, with the midrib excurrent into a long soft spine; margins of the leaf serrulate, especially towards the apex. Peduncle twice as long as the spike or more.

Var. γ, *decipiens*.

PLATE MCCCCIX.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXX. Fig. 163.
P. decipiens, *Nolte. Baker* and *Trimen*, in *Seemann's* Journ. Bot. 1867, p. 71. *Bab.* Man. Brit. Bot. ed. vi. p. 364. *Fries*, Summ. Veg. Scand. p. 68 (67). *Koch.* Syn. Fl. Germ. et Helv. ed. ii. p. 779. *Reich.* l.c. p. 63.

Leaves indistinctly stalked, oblong-oval or oblong-obovate, apiculate or shortly cuspidate, entire on the margins or subserrulate only at the apex. Stipules much smaller than in vars. α and β, and with the wing less prominent. Peduncles not more than twice as long as the spike.

In ponds and slow streams. Rather common, and generally distributed in England, and the southern half of Scotland, but absent from the north of the latter country. Frequent throughout Ireland. Var. β, in deep water. Var. γ, canal at Bath.

England, Scotland, Ireland. Perennial. Summer, Autumn.

The largest of the British pondweeds. Stems often more than a yard long, and the leaves from 3 to 10 inches, by 1 to 2 inches broad, with a thick midrib and lax areolation. The stipules of the upper leaves are frequently 2 or 3 inches long, and have 2 or 3 prominent wings on the back; the peduncles are 2 to 6 inches long, thicker than the stem. The fruiting-spike 1½ to 3 inches. Nuts larger than in any of the previous species of the genus, except P. natans.

The plant figured by Reichenbach as P. lucens, var. coriaceus, of Nolte, I have not seen. Mr. William Wilson found a form in Anglesea with floating leaves, the lamina about 2 inches long, and the petiole about an inch; but they are not distinctly coriaceous.

The var. β is remarkable for the midrib of the leaf running out beyond the point. The leaves also are usually longer and narrower than in var. α, and the peduncles, which are rarely produced, are much longer, often 5 or 6 inches.

Var. γ (for fresh specimens of which I am indebted to Mr. C. E. Broome, and for dried ones to Mr. T. B. Flower and Mrs. Hopkins, the latter under the manuscript name of "P. Burtoni") appears to be a weak state, in which the plant has been injured, and has thrown out numerous fresh branches. The leaves are rarely above 3 inches long. The stipules are frequently not more than ½ inch, and with the wings much fainter, although they are present in all the specimens I have examined. The fruit is apparently always abortive. Some stress is laid on the fact of the margin not being denticulate; but so far as I can judge there are always a few denticulations towards the apex of the leaf. There are certainly such in the specimen of P. decipiens in Fries' Herbarium Normale at Kew, and in the Bath plant they are very conspicuous towards the apex of some of the leaves, and nearly absent in others.

Great Pondweed.

French, *Potamot luisant.* German, *Spiegelndes Samkraut, Trügerisches Samkraut.*

SPECIES (?) XI.—POTAMOGETON "LONGIFOLIUS."

Gay. Bab.

PLATE MCCCCX.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XL. Fig. 70.
Bab. in Engl. Bot. Suppl. No. 2847. Man. Brit. Bot. ed. vi. p. 364.
P. macrophyllus, *Wolfg.* in *Röm.* et *Schultes* Mant. p. 358.

Stem stout, sparingly branched, the lower branches barren. Leaves all similar, the lower ones alternate, the upper opposite, submerged, sessile or subsessile, not amplexicaul, ascending, flat, long, strap-shaped, gradually attenuated at the base but with scarcely any petiole, acute, mucronate, not hooded at the apex, not serrulate at the margins, translucent, with several longitudinal ribs connected by numerous ascending(?) transverse veins. Stipules rather small, "green, lanceolate, with 2 narrow wings on the back" (*Bab.*). Peduncles terminal (?), long, very stout (thicker than the stem), slightly thickened towards the apex. Fruit (of the Irish plant) unknown.

A single specimen, gathered in deep water, Loch Corrib, Galway, by Mr. John Ball, in 1835. It has not been found since.

Ireland. Perennial. Autumn.

Of this plant I have never seen British specimens. Judging from the figure in "English Botany Supplement," in which the leaves are represented as partially clasping, and from the very long peduncle, (6 inches long), I was inclined to believe it a form of P. prælongus. But Professor Babington has kindly examined his Irish specimen, and thus writes:—"I do not think that this is P. prælongus. It does not seem that even the floral leaves are really amplexicaul, as they appear decidedly narrowed to their base, and those of the branches have mostly very short stalks, nor is their tip hooded, as I have always found it to be in true P. prælongus, but terminates in a point, like those of P. lucens. It seems also to have the winged stipules of that plant, but its leaves are not mutually denticulate. It is *Reich.* Fl. Germ. Exsicc. No. 2501."

P. longifolius, *Gay*, of which there are numerous French specimens in his herbarium, has the leaves more narrowed towards the base than in the "Engl. Bot. Suppl." figure, but is probably the same. In the continental plant the peduncles are sometimes long, sometimes short;

the leaves variable in length, and often stalked: I have little doubt about its being merely a variety of P. lucens.

Long-leaved Pondweed.

SPECIES XII.—POTAMOGETON PRÆLONGUS. *Wulf.*

PLATE MCCCCXI.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXXIII. Fig. 59.

Stems stout, sparingly branched, the lower branches barren. Leaves all similar, the lower ones alternate, the upper ones opposite, submerged, sessile and semiamplexicaul, ascending, flat, long, strapshaped or oblong-strapshaped or oblong, rounded at the base, obtuse, not apiculate nor cuspidate but hooded at the apex, not serrate at the margins, with 3 strong ribs and several fainter intermediate ones connected by numerous transverse veins, and with a narrow band of elongate cancellate areolation along the sides of the midrib. Stipules rather large, blunt, not winged on the back, subscarious, with numerous slender longitudinal fibres. Peduncles terminal and axillary, very long, rather stout (but not thicker than the stem), very slightly thickened towards the apex. Sepals with their lamina transversely roundish-oval. Fruiting-spike dense, cylindrical, many-flowered. Nuts green, very large, not acuminated, scarcely compressed, slightly curved along the upper margin, half-obovate and very sharply keeled or winged beneath, terminated by a short beak forming a continuation of the upper margin. Plant bright green, rarely tinged with red, retaining its colour when dry, the leaves not shining.

In deep water, in rivers and lakes. Rather scarce, but widely distributed on the east side of the island where it extends from Essex to Nairn. Except towards the east coast, it seems to be very scarce, and its area of distribution is bounded towards the west and northwest by the counties of Berks, Oxford, Stafford, Western York, (Malham Tarn, Dr. J. Windsor), and Westmoreland (Mr. Borrer). Very local, and rare in Ireland, where it is confined to the west and north.

England, Scotland, Ireland. Perennial. Early Summer.

A large species, with somewhat the habit of P. rufescens or P. lucens. The leaves on the main stem are often 4 to 6 inches long, those on the barren shoots smaller, all of them slightly amplexicaul, and slightly hooded at the apex, never cuspidate or pointed, as in P. lucens. Fruiting-peduncles 5 inches to 1 foot long, frequently several together—i.e. a terminal one, and one or two axillary ones, but often there are leafy branches in place of the axillary peduncles. Fruiting-spike 1 to 2 inches long, consequently shorter than that of P. lucens, but much thicker. Nuts larger than in any of the other British species, nearly $\frac{1}{4}$ inch long, by $\frac{1}{6}$ inch deep, keeled when dry. Prof. Babington states that when fresh they are rounded, and rarely keeled on the back; but a large number of specimens sent me from Rockland Broad, Norfolk, by the Rev. Kirby Trimmer, had the fresh fruit furnished with a very acute keel, and the Rev. W. W. Newbould informs me that this is also the case in the plant found at Oxford.

The plant from the Waveney at Bungay, collected by Professor Babington, has the dried fruit smaller than that from Norfolk, more compressed, with a fainter central, and much more prominent lateral keels, in this agreeing with the plant from Loch Lee, Nairn, and Guthrie Burn, Forfar, from both of which stations I have specimens in fruit.

Long-stalked Pondweed.

French, *Potamot flexueux.* German, *Gestrecktes Samkraut.*

SPECIES XIII.—**POTAMOGETON PERFOLIATUS.** *Linn.*

PLATE MCCCCXII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXIX. Fig. 53.

Stems slender, sparingly branched, the lower branches barren, the upper branching more or less dichotomous. Leaves all similar, the lower ones alternate, the uppermost and those at the base of the forks of the stem opposite, submerged, sessile and amplexicaul, spreading-ascending, flat, ovate or oblong-lanceolate, cordate at the base, obtuse or subacute, not apiculate nor cuspidate nor hooded at the apex, not serrate at the margin, with 5 to 7 strong ribs and several fainter intermediate ones connected by rather distant transverse veins, and with narrow bands of very elongate cancellate areolation at the sides of the ribs. Stipules small, usually absent or evanescent, except in the uppermost leaves and those at the forks of the stem, and often present only in the latter case and in those leaves which have peduncles in their axils, subacute, scarious, with a few distant slender fibres. Peduncles terminal between the forks of the stem and axillary, rather short, slender, equal in thickness. Sepals with their lamina suborbicular. Fruiting-spike rather dense, shortly oblong-cylindrical, rather few-flowered. Nuts olive, rather large, not acuminated and but slightly compressed, curved along the upper margin, semicircular and very bluntly keeled on the back, terminated by a very short central beak. Plant bright green, turning olive and sometimes black and dim in drying.

In ditches, slow streams, and lakes. Rather common, and generally distributed, extending north to Orkney.

England, Scotland, Ireland. Perennial. Summer, Autumn.

A well-marked species, with tender, diaphanous leaves cordate at the base, 1 to 3 inches long, and with the stipules either entirely absent or mostly decayed before the plant flowers, their place being indicated only by a few fibres, except at the places where the leaves are opposite, or where peduncles are produced.

In deep water, as in the Kyle of Sutherland, the Lossie, and other places, a form occurs with the leaves much narrower than usual, less amplexicaul, darker in colour, and turning black and dim in drying.

Allied to this elongate form is the plant which represents P. nigrescens, *Fries*,* in his Herbarium Normale at Kew, but the specimen is very imperfect, and may readily have got mixed with the true P. nigrescens, of which the description corresponds well with the P. lanceolatus, *Smith*.

P. perfoliatus is, in some states, liable to be confounded with P. nitens, but the latter has much firmer and less amplexicaul leaves, not cordate at the base; there is no tendency to dichotomous ramification; the peduncles are stouter, and more or less evidently thickened upwards. In P. nitens the stipules are of much thicker texture, and consequently do not so soon decay.

Perfoliate Pondweed.

French, *Potamot perfolié.* German, *Durchwachsenes Samkraut.*

SPECIES XIV.—POTAMOGETON CRISPUS. *Linn.*

PLATE MCCCCXIII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tabs. XXIX. and XXX. Figs. 50 to 52.

Stems slender, sparingly branched, the lower branches barren, the upper branching more or less dichotomous. Leaves all similar, the lower ones alternate, the upper ones and those at the base of the forks opposite, submerged, sessile, semi-amplexicaul, spreading-ascending, usually strongly undulated or crisped, oblong or strapshaped-oblong, rounded at the base, obtuse or subobtuse, not apiculate nor cuspidate nor hooded at the apex, serrulate, with 3 strong ribs and usually a fainter rib on each side near the margin, connected by rather distant ascending veins, and with a narrow band of very elongate cancellate areolation along the sides of the midrib only; leaves of the young shoots strapshaped, flat, and 3-nerved. Stipules small, subobtuse; the lower ones often evanescent, scarious, with a few distant slender fibres. Peduncles terminal between the forks of the stem and axillary, rather short, moderately stout, tapering towards the apex, usually curved. Sepals with their lamina suborbicular. Fruiting-spike rather lax, oblong-ovoid, few-flowered. Nuts fuscous-olive, rather large, greatly acuminated, compressed, curved along the upper margin, rounded and bluntly keeled on the back, terminated by a long slightly recurved subulate beak about as long as the nut itself. Plant olive, often tinged with brownish-red, especially on the stem and midrib of the leaves, retaining its colour when dried; leaves slightly shining.

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* This plant (which appears in want of a name) is in M. Gay's herbarium from between Falaise and Vire, collected by M. Lenormand, and named "P. prælongus" (*Brébisson*!). But the collector informs me that M. Brébisson now considers it to be P. nitens, of which it may be an elongated abnormal form.

In ditches and ponds. Very common, and generally distributed, except in the extreme north of Scotland.

England, Scotland, Ireland. Perennial. Summer.

Stems branching as in P. perfoliatus. Leaves 1 to 3 inches long, remarkably undulated at the margins and tinged with reddish-brown, so that the plant may be very readily recognised. Fruiting peduncles 1 to 4 inches long. Fruit very different from that of all the other species, about ¼ inch long, but half of this length is occupied by the beak.

The young state of this plant is the P. serratus of Hudson; it is very unlike the ordinary form, and might easily be passed over as P. obtusifolius, but the leaves are more or less serrulate. A specimen of the ordinary form gathered late in August had thrown out numerous branches of P. serratus from its rootstock, so it cannot be considered as even a variety.

Curled Pondweed.

French, *Potamot crépu.* German, *Krauses Samkraut.*

SECTION II.—OPPOSITIFOLII.

Leaves all similar and opposite, sessile and amplexicaul, ovate or lanceolate, with involute vernation. Stipules absent, except at the base of the peduncles. Peduncles terminal. Spikes few-flowered, very short, dense.

SPECIES XV.—**POTAMOGETON DENSUS.** *Linn.*

PLATE MCCCCXIV.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXVII. Figs. 46 to 49.
Billot, Fl. Gall. et Germ. Exsicc. No. 2552.

Stems rather slender, sparingly dichotomously branched. Leaves all submerged and translucent, opposite, amplexicaul, folded longitudinally and recurved, ovate or lanceolate, acuminate, finely serrulate towards the apex, 3- to 5-ribbed, the ribs connected by transverse veins only at the apex. Stipules absent, except from the pairs of leaves from which peduncles spring. Peduncles terminal from the forks of the stem, short, slender, not thickened upwards, sharply recurved in flower and fruit. Sepals with the lamina ovate-deltoid. Fruiting-spike ovoid, 2- to 6-flowered. Nuts pale olive, rather large, suborbicular-obovate, compressed, convex on the upper margin, rounded and sharply keeled on the back, with a short recurved terminal beak. Plant bright green, retaining its colour when dry.

In ditches, ponds, and slow streams. Common, and generally distributed in England. Rare in Scotland, where it is known to occur only in the counties of Edinburgh, Haddington, and Lanark. Local, and rare in Ireland, and confined to the southern half of the island.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Rootstock sending up brittle stems 3 to 18 inches long, with short internodes and dichotomous branching. Leaves increasing in size upwards, the largest ½ to 1½ inch long, generally more or less recurved, and slightly folded. Peduncles shorter than the leaves, usually 4-flowered. Nuts olive, about ⅛ inch long.

This cannot be confounded with any other species, as the leaves are all sessile, opposite, and submerged, and without stipules, except those at the forks of the stem, which are accompanied by membranous stipules adhering to the leaf at the base, and with an oblong free portion.

Opposite-leaved Pondweed.

French, *Potamot serré.* German, *Dichtblättriges Samkraut.*

SECTION III.—GRAMINIFOLII.

Leaves alternate, the upper ones opposite, all similar, sessile, linear, with flat vernation, 1- to 5-ribbed, with few transverse veins. Stipules free. Peduncles terminal and pseudo-lateral. Spikes few-flowered, dense.

SPECIES XVI.—POTAMOGETON ZOSTERIFOLIUS.

PLATE MCCCCXV.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXVII. Fig. 45.

P. compressus, *Fries*, Nov. Fl. Succ. p. 44, and Summ. Veg. Scand. pp. 68 (67) and 215. *Koch.* Syn. Fl. Germ. et Helv. ed. ii. p. 779. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 316 (non *Linn.* Herb.).

P. cuspidatus, *Sm.* Engl. Fl. Vol. I. p. 234.

Stem flattened, broad, and subfoliaceous, scarcely dichotomous.

Leaves all similar, sessile and semiamplexicaul, broadly linear, broad at the base, acuminate-cuspidate, translucent, with 3 (rarely 5) strong ribs, and numerous faint ones between them. Stipules large, acute, pellucid, scarious, with numerous slender longitudinal fibres. Peduncles terminal between the forks of the stem, and sometimes pseudo-axillary,* longer than the spike, and often twice as long, rather stout, slightly thickened upwards. Sepals with their lamina suborbicular. Fruiting-spike oblong or cylindrical-oblong, dense, many-flowered. Fruit olive, rather large, very slightly compressed, not acuminated, convex on the upper margin, on which there is a slight boss, but no tooth near the base, nearly semicircular, and bluntly 3-keeled on the back, terminated by a short central beak. Plant bright green or olive-green, retaining its colour when dried.

In ditches, slow streams, and lakes. Rather rare. I have seen specimens from Essex, Middlesex, Cambridge, Warwick, Stafford, Leicester, Norfolk, Derby, and Forfar, and it is reported from Fife, and to have been formerly seen in a rivulet at Nottingham, and at Hovingham in Yorkshire. In Ireland it is very rare, and has been found only in County Down.

England, Scotland, Ireland.

Stems remarkably flattened, $\frac{1}{8}$ to $\frac{1}{4}$ inch broad. Leaves 3 to 6 inches long, $\frac{1}{6}$ to $\frac{1}{4}$ inch broad, rather suddenly contracted into a cuspidate point; peduncles, exclusive of the spike, $1\frac{1}{2}$ to 3 inches long. Spike $\frac{3}{4}$ to 1 inch long, with numerous flowers. Fruit $\frac{1}{5}$ inch long.

Grass wrack-leaved Pondweed.

German, *Flachsstengeliges Samkraut.*

SPECIES XVII.—**POTAMOGETON ACUTIFOLIUS.** *Link.*

PLATE MCCCCXVI.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXVI. Fig. 44.
Billot, Fl. Gall. et Germ. Exsicc. No. 1067.

Stem flattened, broad, and subfoliaceous, repeatedly dichotomous. Leaves all similar, sessile and semiamplexicaul, linear, broad at the base, acuminate-acute, translucent, with 3 strong ribs and numerous faint ones between them. Stipules rather large, acute, scarious, with numerous rather strong longitudinal fibres. Peduncles terminal between the forks of the stem, scarcely exceeding the spike, slender, not thickened upwards. Sepals with their lamina roundish-rhombic. Fruiting-spike subglobose, dense, few-flowered. Fruit moderately large, greenish-olive, considerably compressed, not acuminated, very slightly convex on the upper margin, on which there is a large prominent tooth near the base, half-obovate and bluntly 3-keeled on the back, terminated by a rather long slightly recurved beak forming a continuation of the upper margin. Plant bright green, retaining its colour when dry.

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* No doubt where they appear to be axillary, it arises from one of the two branches only being developed.

In ditches and ponds. Rare. Wareham, Dorset (Mr. I. C. Mansel); Amberly, Sussex (Mr. Borrer); Black Sea, Wandsworth Common (Mr. W. F. Saunders), and Weybridge, Surrey (Mr. H. C. Watson); Higham by Norwich, Haddiscome, Brundall and Buckenham Ferry, Norfolk (Rev. Kirby Trimmer). Probably in some of the intermediate counties, but liable to be passed over as P. zosterifolius or P. obtusifolius.

England. Perennial. Summer.

Stem and foliage very similar to that of P. zosterifolius, but usually a more slender plant, with shorter and narrower leaves, 2 to 4 inches long by $\frac{1}{8}$ to $\frac{1}{6}$ inch broad, more gradually acuminated, and with stronger stipules. The stem too is usually more branched, and with a greater tendency in the branches to become dichotomous. Still when the plant is not in flower or fruit, it may easily be passed over as a small state of P. zosterifolius. The peduncles, however, are not more than $\frac{1}{4}$ to $\frac{1}{2}$ inch long, the spike much shorter, rarely above $\frac{1}{4}$ or $\frac{3}{8}$ inch long, with very few flowers. The fruit is smaller, $\frac{1}{8}$ inch long, flatter, with a strong tooth on the upper margin, and is much more convex on the back, so that the curve is more than a semicircle; the beak forms a continuation of the upper margin, and is more than twice as long as that of P. zosterifolius. With these differences in the fruit it is impossible to consider it a subspecies of that plant.

Sharp-leaved Pondweed.

French, *Potamot à feuilles acuminées.* German, *Spitzblättriges Samkraut.*

SPECIES XVIII.—**POTAMOGETON OBTUSIFOLIUS.** *Mert. & Koch.*

PLATE MCCCCXVII.

h. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXV. Fig. 43.
Billot, Fl. Gall. et Germ. Exsicc. No. 652.
P. gramineus *Sm.* Engl. Bot. No. 2253, and Engl. Fl. Vol. I. p. 235. *Hook. & Arn.* Brit. Fl. ed. viii. p. 480 (non *Linn.* Herb.).

Stem 4-sided, slightly compressed, slender, not foliaceous, repeatedly dichotomous. Leaves all similar, sessile, linear, narrowed towards the

base, obtuse, subapiculate, translucent, with 3 (rarely 5) strong ribs, without faint ones between them. Stipules rather small, subacute, scarious, with numerous slender longitudinal fibres. Peduncles terminal between the forks of the stem, equalling or slightly exceeding the spike, rather slender, not thickened upwards. Sepals with their lamina deltoid-rhombic. Pistils 4. Fruiting-spike oblong-ovoid, dense, rather few-flowered. Fruit moderately large, brownish-olive, slightly compressed, not acuminated, convex on the upper margin, on which there is no tooth, semicircular and 3-keeled on the back, terminated by a very short central straight beak. Plant rather dark green, sometimes tinged with red, retaining its colour when dried.

In ditches and ponds. Rather scarce, but widely distributed. I have seen specimens from the counties of Sussex, Kent, Surrey, Hereford, Warwick, Salop, Chester, Lancaster, and Kincardine, and there is good authority for extending its range south-west to Dorset and Devon. Rare, and local in Ireland, where it occurs both in the south and north, but has not been observed in the midland counties.

England, Scotland, Ireland. Perennial. Summer.

Usually a smaller and more branched plant than the two preceding species, and differing greatly in its slender stem, which is scarcely flattened, and in the absence of faint intermediate ribs in the leaves, which are also distinctly narrowed towards the base. The leaves are 2 to 3 inches long by $\frac{1}{8}$ to $\frac{1}{6}$ inch broad, and are not acuminated into an acute point at the apex, where the margins meet in the form of a wide gothic arch. Peduncles, exclusive of the spike, $\frac{1}{2}$ to $\frac{3}{4}$ inch long. Spike about $\frac{1}{2}$ inch long. Nuts $\frac{1}{6}$ inch long, in form resembling those of P. zosterifolius, but more convex on the upper or inner margin.

This is a well-marked species, which only a superficial examination could confound with either of the two preceding species. I have never seen more than 3 ribs on the leaves of this plant, but Koch says they are 3- to 5-nerved.

Grassy Pondweed.

French, *Potamot à feuilles obtuses.* German, *Stumpfblättriges Samkraut*

SPECIES (?) XIX.—POTAMOGETON MUCRONATUS. *Schrad.*

PLATE MCCCCXVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXIV. Fig. 42.

P. compressus, *Sm.* Engl. Bot. ed. i. No. 418. Engl. Fl. Vol. I. p. 233. *Bab.* Man. Brit. Bot. ed. vi. p. 365. *Reich.* l.c. p. 15.

P. pusillus, var. major *Fries.* Nov. Fl. Suec, p. 48, and Summ. Veg. Scand. p. 69 (68). *Hook. & Arn.* Brit. Fl. ed. viii. p. 480.

P. Oederi, "*Meyer,*" *Boreau*, Fl. du Centr. de la Fr. ed. iii. Vol. II. p. 601.

Stem 4-sided, considerably compressed, slender, not foliaceous,

nearly simple and scarcely dichotomous. Leaves all similar, sessile, linear, narrowed towards the base, shortly acuminate-cuspidate, with 5 (rarely 3) longitudinal ribs without faint ones between them, mostly with axillary fascicles of smaller leaves. Stipules small, acuminate or acute, scarious, with numerous rather slender longitudinal fibres. Peduncles terminal between the forks of the stem (but the lower ones pseudo-axillary, from one of the forks being reduced to a fascicle of leaves), longer than the spike, usually twice or thrice as long, rather slender, slightly thickened upwards. Sepals with their lamina suborbicular. Pistils 4. Fruiting-spike cylindrical-oblong, slightly interrupted, few-flowered. Fruit rather small, brownish-olive, slightly compressed, acuminated, convex on the upper margin, on which there is no tooth, half oval and bluntly 3-keeled on the back, terminated by a rather short central slightly recurved beak. Plant rather dull green, retaining its colour when dried.

In ponds and ditches. Apparently rare. I have found it myself only on Wray Common, near Reigate, where it is now extinct by drainage. Besides this, I have specimens from Stoke Heath, Warrington. It has been so much confounded with large forms of P. pusillus that I do not venture to quote stations from which I have not seen specimens.

England, [Scotland ? Ireland ?]. Perennial. Summer.

Very similar in general aspect to P. gramineus, but the leaves are usually longer and much more distant, the stems much more flattened and less branched, the greater number of branches being reduced merely to fascicles of leaves. The leaves are acuminate-cuspidate, and have two more ribs than those of P. obtusifolius, though the two next the margin of the leaf are said to be sometimes absent. The peduncles (exclusive of the spike) are, in fruit, ¾ to 1½ inch long, the spike ⅜ to ½ inch, distinctly interrupted. The fruit is considerably smaller, scarcely ⅛ inch long, bulging out towards the apex on the upper side, and with the margin forming less than a semicircle on the lower; the beak conspicuous, about ⅙ of the length of the fruit. Whether this be really distinct from P. pusillus, I have seen too few specimens to enable me to decide.

Flat-stemmed Pondweed.

German, *Stachelspitziges Samkraut.*

SPECIES XX.—POTAMOGETON PUSILLUS. *Linn.*

PLATE MCCCCXIX.

Billot, Fl. Gall. et Germ. Exsicc. No. 653.

Stem subcylindrical, not compressed, filiform, subdichotomous.

Leaves all similar, sessile and semiamplexicaul, narrowly linear, very slightly narrowed towards the base, subacute or subobtuse, with 3 (rarely only 1) longitudinal ribs without fainter ones between them, mostly without axillary fascicles of leaves. Stipules small, subacute, subscarious, with numerous slender longitudinal fibres. Peduncles terminal between the forks of the stem, longer than the stem (usually twice as long, or even more), filiform, not thickened upwards. Sepals with their lamina suborbicular. Pistils 4. Fruiting-spike oblong-ovoid, not interrupted, few-flowered. Fruit small, greenish-olive, scarcely compressed, acuminated, convex on the upper margin, on which there is no tooth, half oval-obovate and very bluntly 3-keeled on the back, terminated by a rather short, central, slightly recurved beak. Plant rather dull deep green, becoming darker when dried.

Var. α, *vulgaris.*

PLATE MCCCCXIX.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXII. Fig. 38.

Leaves 3-nerved, subacute.

Var. β, *tenuissimus. Fries.*

PLATE MCCCCXX.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXII. Fig. 39.

Leaves very narrow, cuspidate, 3-nerved or 1-nerved, whole plant smaller than var. α, and with the leaves more divaricate.

In ponds and ditches. Rather common, and generally distributed, ranging from Cornwall, Dorset, Kent, and Sussex, northward to Orkney. Frequent throughout Ireland.

England, Scotland, Ireland. Perennial. Summer

Stems very slender, usually branched. Leaves $\frac{3}{4}$ to 2 inches long, rarely above $\frac{1}{10}$ inch broad, and in var. β scarcely above $\frac{1}{16}$ inch. Peduncles (exclusive of the spike) $\frac{1}{2}$ to 1 inch long, much more slender than in any of the preceding species. Fruiting-spike $\frac{1}{4}$ to $\frac{1}{2}$ inch long. Nuts $\frac{1}{12}$ inch long.

From P. mucronatus this differs in its more slender and uncompressed stem, its narrower leaves, with not more than three veins, and with their base much less narrowed, their apex less acuminate, their much more slender peduncles, and the smaller, less compressed fruit, more convex on the lower side, and with the beak rather longer in proportion. Besides these characteristics, the mode of growth is different, the leaves are not so far apart, and have not fascicles of leaves or very short branches in their axils, which is almost always the case in P.

mucronatus. Sometimes, however, the two are extremely difficult to distinguish in the dried state when not in flower or fruit, and they are probably distinct only as subspecies.

Small Pondweed.

French, *Potamot fluet.* German, *Kleines Samkraut.*

SPECIES XXI.—**POTAMOGETON TRICHOIDES.** *Cham.*

PLATE MCCCCXX.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XXI. Fig. 34, and Tab. XXII. Fig. 35.
Billot, Fl. Gall. et Germ. Exsicc. No. 654.
P. monogynus, *Gay* in *Coss. & Germ.* Fl. Par. ed. i. p. 572.
P. tuberculatus, "*Ten. & Guss.* in Act. Soc. Borb. Vol. V. p. 430" (*Coss.*).

Stem subcylindrical, not compressed, filiform, repeatedly dichotomous or trichotomous. Leaves all similar, sessile and semi-amplexicaul, linear-setaceous, not narrowed towards the base, acute, with only 1 longidinal rib; many of the leaves with 1 or 2 branches in their axils. Stipules small, subacute, subscarious, with numerous slender longitudinal fibres. Peduncles terminal from the forks of the stem, much longer than the spike (usually 6 or 8 times as long), filiform, not thickened upwards. Sepals with their lamina suborbicular. Pistil solitary. Fruiting-spike oblong-ovoid or subglobose, usually slightly interrupted, very few-flowered. Fruit rather small, greenish-olive, slightly compressed, not acuminated, nearly straight along the upper margin, where there is a prominent tooth near the base, semicircular and bluntly keeled on the back, terminated by a very short straight beak forming a continuation of the upper margin; keel nearly entire, subdenticulate or tuberculate. Plant deep dull green, becoming much darker when dried.

In ponds, ditches, and slow water, in muddy soils. Discovered by the Rev. Kirby Trimmer at Framingham Earl, Norfolk: the following other stations are given in that gentleman's "Flora of Norfolk":—"Swardiston. Swanesthorpe. Alpington. Marlingford. Lyng. Alburgh. Pulham. St. Mary the Virgin. In a slow water ditch near the railway station, Tivetshall. Walpole St. Peter (Mr. Lowe)."

England. Perennial. Summer.

Very similar in habit to P. pusillus, var. tenuissimus, but more copiously branched, with the branches divaricate. The leaves narrower, more slender and rigid, rarely above 1 to 1½ inch long: the peduncles are much longer, frequently 2 inches long: the flowers are fewer, and appear to have always only one pistil: the fruit is about $\frac{1}{16}$ inch long and has a distinct tooth on the upper margin, and is much more convex on the lower, and in all the specimens I have seen is more or less crenulated or subtuberculated on the back; the beak forms a continuation of the upper margin, instead of being in the middle of the apex.

I am indebted to the Rev. Kirby Trimmer for fresh specimens of this plant.

Hair-leaved Pondweed.

French, *Potamot à feuilles capillaires.* German, *Haarförmiges Samkraut.*

SECTION IV.—PECTINATI.

Leaves all similar, alternate, the uppermost ones opposite, sheathing at the base, linear or setaceous, with flat vernation, 1- to 3-ribbed. Stipules adhering to the petiole of the leaf to form the sheath. Peduncles terminal or pseudo-lateral. Spikes few-flowered, often elongated, interrupted.

SPECIES XXII.—**POTAMOGETON PECTINATUS.** *Linn.*

PLATES MCCCCXXI. MCCCCXXII. MCCCCXXIII.

Billot, Fl. Gall. et Germ. Exsicc. No. 3250.

Stem cylindrical or subcompressed, slender, dichotomous or trichotomous. Leaves all similar and subtranslucent, with sheathing petioles, the earlier ones linear or broadly linear, the upper narrowly linear or setaceous, acute, with only 1 longitudinal rib, or the lower ones with 3 to 5 ribs, many of the leaves with 1 or 2 branches in their axils. Stipules rather long and narrow, subscarious, united to the sheathing petiole of the leaf, with only the apex free. Peduncles terminal or pseudo-lateral, longer than the spike, generally 3 to 5 times as long, filiform, not thickened upwards. Sepals with their lamina suborbicular, reniform. Fruiting-spike rather short, slightly interrupted, few-flowered, often with the lowest whorl or two whorls of flowers distant from the others; the terminal ones subapproximate. Fruit large, olive tinged with orange-brown, scarcely compressed, straight or slightly convex on the upper margin, half obovate-semicircular and indistinctly 3-keeled on the back, with a very short beak forming a continuation of the upper margin. Plant dull olive-green, becoming darker when dried.

SUB-SPECIES (?) I.—**Potamogeton flabellatus.** *Bab.*

PLATE MCCCCXXI.

h. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XIX. Fig. 31.
Bab. Man. Brit. Bot. ed. vi. p. 366, and Phytol. Vol. IV. p. 1158.
P. zosteraceus, *Bab.* Man. Brit. Bot. ed. i. p. 325 (non *Fries*).
P. pectinatus, var. β, *Hook. & Arn.* Brit. Fl. ed. viii. p. 479.
P. pectinatus, "var. dichotomus, *Wallr.*" *Reich.* l. c. p. 12.
"P. Vaillantii, *Röm. & Schultes.*" Teste *Reich.* l. c.

Leaves flat; the earlier ones broadly linear, 3- to 5-ribbed; upper leaves narrowly linear, 1- to 3-ribbed. Nuts nearly straight on the upper margin, with the lateral keels indistinct; the central keel prominent.

In rivers, ditches, and canals, in fresh and brackish (?) water. Apparently not uncommon in England, extending north to Lancashire and Yorkshire, but the plant is so confounded with the following subspecies that it is impossible at present to give its exact distribution. In Ireland it is found near Cork, Fermoy, Clonmel, and near Straffan, Kildare.

England, Ireland. Perennial. Summer.

Rootstock creeping, springing from a small tuber. Early leaves 3 to 8 inches long, and ⅛ to ⅙ inch wide; these leaves, however, are mostly decayed by the time the plant comes into flower, and the upper leaves are not more than 1/12 inch broad, and often narrower. Flowers in 4 to 8 whorls, mostly 2 in a whorl. Peduncles (exclusive of the spike) 1 to 4 inches long; the spike itself 1 to 2 inches. Nuts ⅙ inch long. The stipules, adhering to the leaf-stalks and forming a basal sheath, distinguish this plant, when not in flower, from all those of the preceding sections.

The Rev. Kirby Trimmer, in the "Flora of Norfolk," states that in the Trent, by Walton-on-Trent bridge (Derby), he has "always met with plenty of the broad lower leaves in undecayed condition through the months of July and August."

Fan-like Pondweed

SUB-SPECIES (?) II.—**Potamogeton eu-pectinatus.**

PLATES MCCCCXXII. MCCCCXXIII.

Billot, Fl. Gall. et Germ. Exsicc. No. 3250.
P. pectinatus, *Bab.* Man. Brit. Bot. ed. vi. p. 366.
P. pectinatus, var. *a*, *Hook. & Arn.* Brit. Fl. ed. viii. p. 479.

Early leaves flat, linear, usually 3-ribbed; upper leaves setaceous, 1-ribbed, composed of 2 interrupted tubes. Nuts slightly convex on the upper margin, with the lateral keels more prominent than the central one.

Var. α, *genuinus.*

PLATE MCCCCXXII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XIX. Fig. 30.

Leaves and branches rather few and distant, nearly equally disposed over the stem. Leaves all similar, the early ones 1-ribbed.

Var. β, *scoparius.* *Wallr.*

PLATE MCCCCXXIII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XIX. Fig. 32.
P. marinus, *Huds.* Fl. Angl. ed. ii. p. 77 (non *Linn.* Herb.).

Stem at length nearly bare of leaves and branches below, very leafy and much branched towards the apex at the time of flowering. Early leaves flat, 3-ribbed; upper leaves setaceous, 1-ribbed.

Var. α in lakes and ponds, in fresh water. Frequent in England. Rare in Scotland, where I have gathered it in Duddingston Loch, Edinburgh, Loch Gelly and Camilla Loch, Fife, and Orphir Loch, on the mainland of Orkney, and I have specimens from between Troon and Ayr.

Var. β, in brackish ditches. Apparently confined to England, where it is very plentiful in the south, and whence I have seen specimens as far north as Coatham, Yorkshire, and Rhyl, Flint. One or both of the forms are frequent in Ireland.

England, Scotland, Ireland. Perennial. Summer.

A variable plant, with the upper leaves much narrower than those P. flabellatus, and composed of two united parallel tubes divided by transverse partitions. The early leaves, however, though much narrower than those of P. flabellatus, are sometimes very similar to the later leaves of that plant. The fruit is rather rounder, and has the lateral keels more developed, and the central one usually indistinct. The spike is generally shorter, and with the flowers more crowded towards the apex. The whole plant is also more deeply tinged with olive-brown.

The P. marinus of Hudson seems to be P. eu-pectinatus, var. scoparius, as that is the only form which grows in Sheppey, where it is very abundant: this form connects var. α with P. flabellatus.

Fennel-leaved Pondweed.

French, *Potamot en dents de peigne.* German, *Fadenblättriges Samkraut.*

SPECIES XXIII.—POTAMOGETON FILIFORMIS. *Nolte.*

PLATE MCCCCXXIV.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XVIII. Fig. 27.
P. marinus, "*Linn.*" *Fries*, Nov. Fl. Suec. p. 54, and Summ. Veg. Scand. p. 69 (68) and 216.

Stem cylindrical or subcompressed, slender, filiform, sparingly dichotomous or trichotomous at the base, simple above. Leaves all similar and subtranslucent, with sheathing petioles, setaceous, acute, with only one longitudinal rib, most of the leaves without branches in their axils. Stipules rather long and narrow, subscarious, united to the sheathing petiole of the leaf, with only the apex free. Peduncles terminal, longer than the spike, generally three to five times as long, filiform, not thickened upwards. Sepals with their lamina obovate. Fruiting-spike very long, greatly interrupted, few-flowered, with all the whorls of flowers distant from each other. Fruit rather small, olive, compressed, half-oblanceolate on the upper surface, semicircular and very bluntly 3-keeled on the back, with a very short nearly central beak. Plant grass green, turning nearly black in drying.

In ditches, ponds, and slow streams. Apparently rare. I have specimens from Berwick-on-Tweed, and the Loch of Balgavies, Forfar; and have myself collected it in Loch Gelly, Fife, near Tarbetness, Cromarty; and in ditches at Swanbister, on the mainland of Orkney. Lough Cullen and Lough Conn, co. Mayo.

Scotland, Ireland. Perennial. Summer.

Very similar to P. pectinatus, but much smaller, the stems more slender, shorter and less branched, the leaves longer, tougher, and yellowish green, formed of 2 interrupted tubes as in that plant. Peduncles 3 to 8 inches long, exclusive of the spike. Spike 2 to 5 inches long, of 3 to 5 whorls of flowers, with usually two flowers in each whorl, the whorls separated by much more than their own diameter, especially towards the base of the spike. Nut more compressed, $\frac{1}{5}$ inch long, and consequently much smaller than that of P. pectinatus, and of a paler olive, not tinged with orange-brown, the upper side much more convex towards the apex, and the lower more equally curved.

The fruit of P. filiformis is too dissimilar to that of P. pectinatus to admit of its being considered a subspecies of that plant.

This plant is the P. marinus of the Linnæan Herbarium.

Slender-leaved Pondweed.

German, *Meer-Samkraut.*

GENUS II.—**ZANNICHELLIA.** *Linn.*

Flowers solitary or in pairs, monœcious or polygamous, sessile or subsessile, axillary, issuing from a sheathing bract. Male flowers destitute of a perianth: stamen 1; filament filiform; anther 2- or 4-celled. Female or perfect flowers with a membranous campanulate perianth surrounding the base of the ovary; stamen 1 or none: ovary free, of 4 (rarely 2, 3, 5, or 6) separate 1-celled and 1-ovuled carpels; style short; stigma peltate. Fruit of 4 (rarely 2, 3, 5, or 6) subdrupaceous elongated incurved achenes.

A slender herb, growing in fresh or brackish water, with narrowly linear or linear-filiform alternate parallel-veined submerged translucent leaves, and membranous amplexicaul stipules.

The name of this genus of plants was given to it in honour of Zannichelli, an Italian botanist and naturalist, who published a history of plants, and flourished about 1702.

SPECIES I.—**ZANNICHELLIA PALUSTRIS.** *Linn.*

PLATES MCCCCXXV. MCCCCXXVI.

The only known species.

SUB-SPECIES (?) I.—**Zannichellia eu-palustris.**

PLATE MCCCCXXV.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XVI. Fig. 24.
Billot, Fl. Gall. et Germ. Exsicc. No. 1068.
Z. palustris, *Fries*, Mant. i. p. 16. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 782.
Z. palustris, var. *a*, *Bab.* Man. Brit. Bot. ed. vi. p. 367. *Hook.* & *Arn.* Brit. Fl. ed. viii. p. 485.
Z. Bönn. *C. J. Hartm.* Skand. Fl. ed. ix. p. 216.

Nuts subsessile, spreading, smooth or bluntly crenulated but scarcely winged on the back; beak half as long as the rest of the fruit.

In ditches, pools, and lakes. Common in England. Rather rare, but widely distributed in Scotland. extending to Orkney. Not unfrequent throughout Ireland.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Stems very slender, filiform, branched, rooting, at least at the lower nodes. Leaves 1 to 3 inches long, all submerged, alternate or opposite, narrowly linear or capillary. Stipules large, scarious, free from the leaves, soon disappearing. Flowers very minute, submerged, axillary, subsessile, enveloped in the stipules, which perform the office of bracts. Filament at first short, afterwards lengthening to a greater or less extent; anthers 2- or 4-celled. Nuts 2 to 6 together, brownish-olive, on a very short peduncle, subcylindrical, incurved, ⅛ inch long (including the beak); beak or persistent style about half the length of the rest of the fruit; stigma large, suborbicular, and slightly undulated at the margins. Plant pale pellucid green, turning blackish in drying.

Reichenbach's figure of Z. major, "Bönninghausen," is the nearest of those he gives to our common British plant, but is larger than I have ever seen it, and has the nuts much less spreading; so I do not venture to adopt his name for our sub-species, as Mr. Hartman does.

The form I found in Swanbister Loch, Orkney, is perhaps a distinct sub-species; it has the beak ¼ the length of the nut, which has a scarious entire wing on the inner margins, and a broader crenulated one on the back, but much narrower than in Z. pedicellata. The nuts are divaricate, so it is not Z. polycarpa, *Nolte*

Common Horned Pondweed.

French, *Zannichelle des marais.* German, *Kurzgestielte Zannichellie.*

SUB-SPECIES (?) II.—**Zannichellia pedicellata.** *Fries.*

PLATE MCCCCXXVI.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XVI. Fig. 21.
C. pedunculata, *Reich.* l. c. p. 22.

Nuts distinctly pedicellate, spreading, with a winged crenulate-dentate keel on the back; beak as long as the rest of the fruit.

In brackish ditches. Frequent in England, and probably in Ireland, as it is said to grow near the sea. I have seen no Scotch specimens.

England, Ireland. Annual or Perennial. Summer, Autumn.

Similar to the preceding, but usually larger and more branched. The nuts are larger, paler coloured, on conspicuous pedicels, and with a much longer beak; the upper or inner margin with a very narrow entire wing or raised line, the back with a broad membranous wing decurrent on the pedicel, and denticulated, with a tubercle or point given off from the body of the nut running into each denticulation. The pedicels are commonly about two-thirds the length of the nut, and as long as the common peduncle.

I cannot find that the length of the stamens and the number of cells of the anthers are sufficiently constant to warrant their employment as specific characters, as proposed by M. Gay.

Stalked-fruited Horned Pondweed.

French, *Zannichelle pédonculée.* German, *Langgestielte Zannichellie.*

GENUS III.—**RUPPIA.** *Linn.*

Flowers usually 2 together, perfect, on a short filiform axillary spadix issuing from the sheathing bases of the leaves. Perianth none. Stamens 2; filaments scale-like; anthers 2-celled, affixed by the middle of the back, the cells considerably separated, parallel. Ovary free, of 4 separate 1-celled and 1-ovuled carpels; stigma sessile. Fruit of four longly-stalked obliquely ovate-conical subdrupaceous achenes elevated upon a common peduncle.

A slender herb growing in brackish water, with narrowly linear or linear-filiform parallel-veined submerged translucent leaves with dilated sheathing bases.

This genus of plants was named in honour of the German physician, Henry Ruppius, author of "Flora Jenensis," in 1726.

SPECIES I.—**RUPPIA MARITIMA.** *Linn.*

PLATES MCCCCXXVII. MCCCCXXVIII.

The only known species.

SUB-SPECIES (?) I.—**Ruppia spiralis.** *Hartman.*

PLATE MCCCCXXVII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XVII. Fig. 26
Hartman, Handbk. Scand. Fl. ed. ix. p. 215. *Linn.* Herb.
R. maritima, Auct. Plur.
R. maritima, var. *a*, *Hook.* & *Arn.* Brit. Fl. ed. viii. p. 485.

Leaves narrowly linear, with slightly inflated sheaths. Peduncles elongated at the time of flowering, and raising the spike conspicuously above the water, at length very much longer than the pedicels of the nuts, and irregularly spirally coiled. Anthers oblong, 1½ times as long as broad. Nuts oval-ovate, slightly oblique, abruptly acuminated into a short subcentral beak.

In brackish ditches and pools. Not unfrequent on the south coast of England. I have seen specimens from Somerset, Sussex, and have collected it at Walton-on-the-Naze, Essex. Mr. Baker tells me this is the only form of Ruppia found at Coatham, in Yorkshire. The authors of the "Cybele Hibernica" state that they have seen but a single specimen, which is preserved in the herbarium of the late Dr. Mackay, and labelled near Dublin, &c. It does not appear to occur in Scotland.

England, Ireland (?). Perennial. Late Summer, Autumn.

Stems slender, branched. Leaves alternate and opposite, much resembling those of Potamogeton eu-pectinatus, alternate, and having the stipules adhering to the petiole of the leaf, so as to form a sheath, as in that plant. Peduncles raising the spikes nearly an inch out of the water when in flower, but afterwards twisting spirally, so as to submerge the fruit, at length 2 to 4 inches long. Pedicels of the nuts $\frac{3}{4}$ to 1 inch long or even more. Nuts olive, $\frac{1}{8}$ inch long, succulent and green until completely ripe. Plant bright green, turning black in drying.

Greater Ruppia.

French, *Ruppie maritime.* German, *Meerstrands-Ruppie.*

SUB-SPECIES (?) II.—**Ruppia rostellata.** *Koch.*

PLATE MCCCCXXVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. XVII. Fig. 25.
Billot, Fl. Gall. et Germ. Exsicc. No. 655.
R. maritima, *Linn.* Herb.
R. maritima, var. β, *Hook. & Arn.* Brit. Fl. ed. viii. p. 485.

Leaves linear-setaceous, with close-fitting sheaths. Peduncles very short at the time of flowering, and scarcely raising the spike above the water, at length about as long as or a little longer than the pedicels of the nuts, flexuous. Anthers quadrate-orbicular, about as long as broad. Nuts very obliquely ovate-ovoid, acuminated into a rather short beak which forms a continuation of the outer margin of the nut.

In brackish ditches and pools. Rather common, and generally distributed. I do not possess specimens from counties farther south than Essex and Gloucester, but it occurs at Brading, Isle of Wight, and Mr. H. C. Watson gives it as an inhabitant of Somerset. In Scotland I have collected it in Kirkcudbright, Haddington, and Orkney, and Dr. Dickie states that it occurs in Kincardineshire, and at Banff, and I have no doubt it is the plant generally reported as R. maritima, from Scotland. In Ireland it is not unfrequent, and generally distributed round the coast.

England, Scotland, Ireland. Perennial. Summer. Autumn.

Very similar to R. spiralis, but with narrower leaves and less inflated sheaths, on account of the stipules being narrowed rather suddenly a little above the base. The peduncles are much shorter both in flower and fruit, and though flexuous, I have never seen them curled into rings as in R. spiralis; the nuts are a little smaller and very obliquely acuminated into a longer beak than that of the preceding form; the anthers, too, are rounder.

This plant appears to flower considerably earlier than R. spiralis—at

Walton-on-the-Naze, Essex, where I gathered both forms growing together in the beginning of September, R. spiralis was in full flower, and had none but very young fruit, while R. rostellata had some of the fruit quite ripe.

Lesser Ruppia.

German, *Schnabelfrüchtige Ruppie.*

GENUS IV.—ZOSTERA. *Linn.*

Flowers numerous, monœcious, sessile, disposed in two rows on the face of a flattened membranous spadix which is split longitudinally on the inner face, and terminates in a foliaceous point or lamina. Perianth none. Male flowers consisting of a single subsessile 1-celled anther. Female flowers reduced to a 1-celled and 1-ovuled solitary carpel; style persistent; stigmas 2. Fruit a membranous utricle bursting transversely.

Submerged herbs growing in the sea below or near low water mark, with long ribbon-like dark green parallel-veined leaves.

The name of this genus of plants is taken from the Greek word ζωστήρ a ribbon or girdle, which the leaves slightly resemble.

SPECIES I.—ZOSTERA MARINA. *Linn.*

Plates MCCCCXXIX. MCCCCXXX.

Leaves broadly linear or linear, with 1 to 5 strong ribs, and very numerous slender ones between them. Peduncle of the spathe thickened upwards and compressed, shorter than the spadix. Spadix strap-shaped, without marginal bands, many-flowered. Spathe gradually enlarged above the peduncle, with a long foliaceous point. Nuts oblong-ovoid, longitudinally striate.

Var. α, *genuina.*

Plate MCCCCXXIX.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. IV. Fig. 4.
Z. marina, *Reich.* l. c. p. 3. *Hartm.* Skand. Fl. ed. ix. p. 216.

Leaves broadly linear, 3 to 7 ribbed.

Var. β, *angustifolia.* *Fries.*

Plate MCCCCXXX.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. III. Fig. 3.
Z. angustifolia, *Reich.* l. c. p. 3. *Hartm.* Skand. Fl. ed. ix. p. 217.

Leaves narrowly linear, 1- to 3-ribbed. Peduncles longer in proportion to the spadix than in var. α, and the whole plant smaller.

On sandy and muddy seashores, in bays and inlets, and at the mouths of rivers, near or below low water mark, rarely in brackish ditches. Common, and generally distributed.

England, Scotland, Ireland. Perennial. Late Summer and Autumn.

Rootstock creeping, slender, fleshy. Leaves alternate, sheathing, 9 inches to 2 or 3 feet long, flat, parallel-sided, very obtuse, somewhat succulent, bright grass green, turning black in drying, and bleaching to pure white on the seashore. Spathe resembling the leaves, opening longitudinally down the front at the base. Peduncle, which is green at the apex only, enlarging until it passes gradually into the spathe. Spadix 1½ to 3 inches long. Nuts yellow, oblong-ovoid, about ¼ inch long, with numerous longitudinal ridges.

Var β is intermediate in habit between var. α and Z. nana, but has no tangible characters by which it may be separated from var. α, as far as I can see.

In var α, the leaves are ¼ to ⅜ inch broad, and the peduncles rarely above 1½ inch long to a spadix of 2 inches. In var. β, the leaves are from ⅛ to ⅕ or ⅙ inch broad; the peduncle is 1¼ inch long to a spadix of rather less than 1½ inch, and is also more slender, especially towards the base.

Common Grasswrack.

French, *Zostère marine.* German, *Gemeines Seegras.*

The grasswrack is found forming extensive submarine meadows in estuaries, the lower parts of tidal rivers, and muddy coasts, and likewise grows frequently in salt water ditches. It has a creeping stem, which runs along the surface of the mud, throwing out numerous roots and long grass-like leaves, in the sheathing bases of which are placed the stamen and pistil that constitute the flower in these curious plants. The leaves are very tough and flexible when dry, and are collected on many parts of our coast and the mouths of large rivers for a stuffing material for mattresses, cushions, &c., for which purpose they answer well for a time, but are not durable, and absorb moisture from the air. Large quantities are used in packing earthenware and china. The leaves have been applied medicinally to scrofulous tumours, but seem to have little effect, though they may contain a small portion of iodine, like seaweeds. On some parts of the coast they are largely collected for manure, for which they are probably as valuable as the *Fuci.* On the coast of Ireland, where potash and alkaline salts are procured in large quantities by the burning of sea-weeds, this plant no doubt is often thrown into the furnace with them, and yields the same products.

SPECIES II.—ZOSTERA NANA. *Roth.*

PLATE MCCCCXXXI.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. II. Fig. 2.
Z. minor, "*Nollte.*" *Reich.* l. c. p. 2.

Leaves narrowly linear, with 1 to 3 ribs, and numerous slender ones between them. Peduncle of the spathe filiform, not thickened upwards, longer than the spadix. Spadix oblong-strapshaped, with small marginal bands clasping the pistils, few-flowered. Spathe abruptly enlarged above the peduncle, with a short foliaceous point. Nuts oblong-cylindrical smooth.

On the shores of sandy and muddy creeks and estuaries. Rather rare. On the shore of Brading Harbour, near the ferry, opposite Bembridge, and on the sand head off Ryde, east and west of the pier, Isle of Wight; Poole Harbour, Dorset; Emsworth Creek, between Hants and Sussex; Chichester Creek, Sussex; shores of the Blythe, Northumberland; between Fairland and Hunterstone Point, Ayrshire (Dr. Walker-Arnott); "Montrose Basin, Forfar" (Miss A. Carnegie, per Soc. Bot. Edin.). On the mud creek close to the railway station at Baldoyle, Dublin (Mr. A. G. More).

England, Scotland, Ireland. Perennial. Autumn.

Very similar to Z. marina, var. angustifolia, but a smaller plant, with the leaves 3 to 6 inches long by $\frac{1}{8}$ inch broad; peduncles very slender, $\frac{1}{2}$ to 1 inch long. Spadix $\frac{1}{4}$ to $\frac{1}{2}$ inch long, remarkable for the little bands which proceed from the sides and clasp the ovaries. The fruit is about $\frac{1}{6}$ inch long, much narrower and more cylindrical than that of Z. marina, and smooth in my specimens; but Fries says it is finely striated under a lens.

Dwarf Grasswrack.

French, *Zostère mineur.* German, *Zwerg Seegras.*

GENUS V.—**NAIAS.** *Willd.*

Flowers subsolitary or apparently clustered, diœcious, rarely monœcious, sessile, axillary. Male flower enclosed in a membranous spathe, but destitute of perianth, consisting of a single stamen; anther with or without a filament, 1-celled or 4-celled. Female flower reduced to a single carpel; style short; stigmas 2 or 4. Fruit a subdrupaceous achene, with a membranous separable epicarp.

Slender submerged herbs, growing in fresh water, with opposite linear or somewhat whorled entire or denticulate and sometimes undulated leaves.

This genus of plants is so called from *Nayas*, a water nymph.

SPECIES I.—**NAIAS FLEXILIS.** *Rostk.*

PLATE MCCCCXXXII.

Caulinia flexilis, *Willd.* Spec. Pl. Vol. IV. p. 183.
Fluvialis flexilis, *Pers.* Syn. Vol. II. p. 530.

Leaves ternate or opposite, spreading, pellucid, linear, entire or very finely and remotely serrate, those on the main stem with fascicles of leaves on their axils; sheaths shortly ciliate.

In shallow water, in lakes. Discovered in Britain by Professor Oliver, in a lake near Roundstone, Connemara, between the Clifden Road and the sea, at a mile or two from the village of Roundstone, and found by Dr. D. Moore in a small lake less than a mile from Roundstone, on the way to Urrisbeg.

Ireland. Perennial. Autumn.

A delicate plant, with fragile filiform branched stems growing entirely submerged. Leaves frequently ternate on the main stems, but generally opposite on the branches, ½ to 1 inch long, very delicate and pellucid, with short dilated sheathing bases, commonly with a few short laciniate ciliations on the margins; the upper part entire or with a few remote serratures more marked towards the apex. Flowers diœcious (?) or monœcious (?), axillary. Fruit sessile, elliptical-ovoid, ⅛ inch long, pale brownish-olive, partly enclosed in the sheathing bases of the leaves, sometimes 2 or 3 together in the axils of the leaves of the fascicles, which are developed in the axils of the leaves on the main stem.

The male plant I have not seen. Dr. Asa Gray suspects this species is monœcious, but I can find no male flowers on my specimens, which were collected by Mr. T. Kirk.

Flexible Naias.

French, *Nayade marina.* German, *Biegsames Nixkraut.*

EXCLUDED SPECIES.

POTAMOGETON FLUITANS. *Roth.*

This plant has been frequently recorded as a native of Britain; but the statements have invariably been corrected, some other species having been mistaken for it. Still it is very probable that it may be a British species. In the last edition of Professor Babington's "Manual" it is stated that a plant gathered at Hounslow, in the Lambertian Herbarium at Kew, may be P. fluitans, but the Rev. W. W. Newbould informs me he led Professor Babington into an error about this plant. Although I have twice carefully examined all the

British Potamogetons in the Kew Herbarium, I did not perceive any plant to which this name was applicable.

It may be known by its having the large fruit of P. natans, and the leaves similar to those of the deep water forms of P. polygonifolius. The nearest approach we have to it is the plant called P. sparganiifolius by Professor Babington; but that has always a branched stem, while P. fluitans has a simple one, like that of P. natans.

P. GRACILIS. *Fries.*

At one time Professor Babington was inclined to believe that a plant gathered by Professor Olliver, near Dunstanburg, Northumberland, might prove to be this species; but in the fifth and sixth editions of the "Manual" he says it seems to be P. pusillus.

ORDER LXXVIII.—ALISMACEÆ.

Marsh or aquatic perennial herbs, or very rarely annuals, with a creeping or cormose rootstock. Leaf-bearing stem generally undeveloped. Leaves commonly all radical, sheathing at the base, simple, linear, or with an enlarged lamina which is sometimes cordate or sagittate at the base and with parallel or cancellate venation. Stipules none or nearly wholly adnate. Flowers perfect (rarely unisexual and monœcious) on a leafless radical scape, arranged in a panicle, raceme, or umbel—rarely in a raceme at the extremity of a leafy stem. Perianth regular, of 4 or 6 leaves; in the latter case the 3 outer ones often smaller and herbaceous, the 3 inner larger and petaloid, sometimes all the 6 petaloid, occasionally all the 6 subherbaceous. Stamens 6 to 9, or numerous. Ovary superior, free from the calyx, of 3, 6, or numerous carpels, which are either distinct from the first or separate into cocca or follicles when the fruit is ripe, rarely the carpels are reduced to one; ovules 1 or 2 (rarely more) in each carpel; styles commonly short or almost absent; stigmas simple, more rarely plumose. Fruit of dry carpels or cocca. Seeds solitary, 2 or rarely many in each carpel, with a coriaceous testa, destitute of albumen; radicle pointing towards the hilum.

SUB-ORDER I.—JUNCAGINACEÆ.

Perianth with the segments all similar, herbaceous or somewhat coloured. Stamens 6 or 7; anthers extrorse. Seeds 1 or 2 in each cell of the ovary; embryo straight.

GENUS I.—TRIGLOCHIN. *Linn.*

Flowers perfect. Perianth of 6 deciduous concave subherbaceous similar segments. Stamens 6, inserted near the base of the perianth segments; filaments very short. Ovary 6-celled, the alternate cells sometimes sterile; ovules solitary in each cell; stigmas 3 or 6, sessile or subsessile, plumose. Fruit of 3 or 6 1-seeded cocca, separating from the columella at the base, and at length opening by the ventral suture.

Herbs with grasslike, flat, or semicylindrical leaves, and naked scapes, bearing racemes of minute greenish flowers.

The name of this genus of plants is derived from the Greek words *τρεῖς*, three, and *γλωχὺν*, the head of an arrow, alluding to the pointed valves of the capsule.

SPECIES I.—TRIGLOCHIN PALUSTRE. *Linn.*

PLATE MCCCCXXXIII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. LI. Figs. 90 and 91.
Billot, Fl. Gall. et Germ. Exsicc. No. 1547.

Rootstock not bulbous, producing elongated runners, from which new plants are produced at a distance from the parent. Leaves in solitary tufts, very narrowly linear, semicylindrical, faintly channeled above. Scape curved only at the very base, then straight and erect, longer than the leaves. Fruit clavate-cylindrical, splitting into 3 cocca, which are attenuated into slender pointed bases.

In wet meadows and heaths, and by the sides of ditches. Common, and generally distributed.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Rootstock slender, emitting a number of root-fibres, and sending out slender stolons, which at length become thickened at the apex, and produce new plants almost always at some distance from the parent. Base of the scape invested with the fibrous remains of the leaves of former years. Leaves very variable in length, sometimes little more than an inch, at other times above a foot; in all cases with their bases dilated and sheathing the scape, the sheaths with scarious margins, the leaf itself rush-like, but weak and not rigid. Scape usually solitary from each leaf-tuft, at length 3 inches to 2 feet high, rather more than half of it occupied by the raceme when in fruit. Raceme dense while in flower, lengthening between each pedicel as the flowers wither, and becoming lax in fruit. Pedicels shorter than the perianth when in flower, lengthening afterwards, and commonly a little shorter than the ripe fruit. Perianth segments greenish-yellow with purplish edges, oval, the 3 outer ones spreading, the 3 inner erect. Anthers sessile, purplish, lying in the concavity of the perianth segments. Fruit yellowish-olive, erect, applied to the stem, ½ to ⅜ inch long; carpels attenuated into a narrow base, the 3 carpels separated by slight furrows, and when they fall leaving a triquetrous columella. Plant bright green.

Marsh Arrowgrass.

French, *Troscart des marais.* German, *Sumpf Dreizack.*

This plant is common in wet meadows, and in marshy situations generally.

SPECIES II.—**TRIGLOCHIN MARITIMUM.** *Linn.*

PLATE MCCCCXXXIV.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. LII. Figs. 92 and 93.

Rootstock of numerous slender bulbs growing in a circle, adhering to a common rhizome, without elongated runners. Leaves in cæspitose tufts, semicylindrical, flattened above, flat towards the apex. Scapes more or less curved up to the point where the flowers commence, then erect, longer than the leaves. Fruit oblong-ovoid, splitting into 6 cocca; cocca truncate at the base.

In salt marshes and meadows, and by the sides of ditches by the sea. Common, and generally distributed along the coast.

England, Scotland, Ireland. Perennial. Summer, Autumn.

A stouter and more fleshy plant than T. palustre, and of a paler green colour, with the leaf-tufts forming, by the sheathing bases of the leaves, small fusiform bulbs, which are aggregated and often very numerous in old plants. Leaves 3 to 18 inches long, with more dilated sheathing bases than in T. palustre, and with the free part of the adnate stipules which form the sheath longer than in that plant. Scape 6 inches to 3 feet high, stout, often more than one produced in succession from each leaf-tuft, the lower part as well as the leaves curving slightly, with the convexity turned towards the outside of the tussock formed by the union of the leaf-tufts. Flowers similar in appearance to those of T. palustre, but larger and closer together. Raceme dense both in flower and fruit. Pedicels much shorter than the perianth, and also shorter than the fruit, ascending. Fruit olive-yellow, when fully ripe scarcely ¼ inch long, with 6 carpels, which separate readily from the columella, and do not remain for some time suspended by their apex as in T. palustre. Plant pale green, somewhat glaucous.

Seaside Arrowgrass.

French, *Troscart maritime.* German, *Meerstrands Dreizack.*

GENUS II.—SCHEUCHZERIA. *Linn.*

Perianth persistent, of 6 reflexed subpetaloid segments slightly connected at the base; the inner ones narrower than the outer. Stamens 6, hypogynous; filaments short. Ovary of 3 carpels, cohering at the base; ovules 2 in each cell; stigmas sessile, papilose. Fruit of 3 inflated diverging follicles; each follicle 1- or 2-seeded, opening by the ventral sutures.

A marsh herb with an erect leafy stem and grasslike leaves sheathing at the base. Flowers few, minute, yellowish-green, in a terminal raceme, with leaflike bracts.

This genus of plants is named after Scheuchzer, a celebrated Swiss botanist.

SPECIES I.—SCHEUCHZERIA PALUSTRIS. *Linn.*

PLATE MCCCCXXXV.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXIX. Figs. 927 to 929.
Billot, Fl. Gall. et Germ. Exsicc. No. 649.

The only known species.

In spongy bogs. Rare. Bomere Pool, near Shrewsbury, Salop; Wybunbury Bog, Cheshire; Leckby carr, between Thirsk and Doncaster, Yorkshire; near Methven, Perth.

England, Scotland. Perennial. Early Summer.

Rootstock tough, rather slender, extensively creeping, clothed with the decayed bases of the leaves. Leaves narrowly linear, semicylindrical, with a pore at the apex on the upper side, and with dilated sheathing bases, a very small portion of the adnate stipules being free at the top of the sheaths. The length of the leaves on the barren tufts is 8 inches to 1 foot; those on the flowering stem few, alternate, shorter than those of the barren tufts, but the middle ones overtopping the raceme. Raceme lax, 4- to 8-flowered. Pedicels at first very short, but lengthening in fruit until they are ¼ to 1 inch long, each pedicel in the axil of a bract resembling the leaves, but with a much shorter point. Perianth segments yellowish-green, lanceolate-strapshaped, recurved, at length shrivelling up until they are inconspicuous. Filaments rather short; anthers long and slender, yellow. Fruit formed of 3 (or by abortion of 2) divaricate inflated olive-brown broadly ovoid compressed follicles, about the size of sweet-pea seeds or a little larger. Seeds 1 (or rarely 2) in each follicle, ovoid, pale olive, smooth, about the size of a seed of white mustard.

Marsh Scheuchzeria.

French, *Scheuchzérie des marais.* German, *Sumpfscheuchzeri.*

SUB-ORDER II.—ALISMEÆ.

Perianth with the 3 outer segments herbaceous, the 3 inner larger and petaloid. Stamens 6 or more; anthers introrse, rarely extrorse. Seeds 1 or 2 in each cell of the ovary; embryo hooked.

GENUS III.—SAGITTARIA. *Linn.*

Fowers monœcious. Perianth with the 3 outer leaves herbaceous, subpersistent, the 3 inner leaves larger and petaloid, caducous. Male flowers with numerous hypogynous stamens; filaments filiform; anthers extrorse, affixed by the base. Female flowers with the ovaries very numerous, free, 1-celled and 1-ovuled; stigma simple. Fruit of numerous capitate achenes.

Marsh herbs with the rhizome throwing off runners terminating in bulbs, which produce plants in the succeeding year. Leaves stalked, triangular and then hastate or cordate or strapshaped, the earlier ones without any lamina and submerged or floating. Flowers white or lilac, in a raceme on a scape with verticellate peduncles; the male flowers at the top and the female below them.

The name of this genus of plants comes from *sagitta*, an arrow, which the leaves of the species are thought to resemble.

SPECIES I.—SAGITTARIA SAGITTIFOLIA. *Linn.*

PLATE MCCCCXXXVI.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. LIII. Fig. 94.
Billot, Fl. Gall. et Germ. Exsicc. No. 2913.

Submerged leaves (phyllodia) linear-strapshaped or linear-oblanceolate, submerged or floating at the apex, translucent; aerial leaves sagittate with straight acute basal lobes. Scape simple. Peduncles whorled, those of the fertile flowers not half as long as those of the sterile flowers. Filaments subulate, longer than the anthers.

In canals, ditches, and slow running rivers. Rather scarce, but generally distributed in England. Common in the fenny counties. Rare, and doubtfully native in Scotland, though it occurs about Renfrew and other places near Glasgow. Local in Ireland, but occurring in the west, centre, and north-east of the island.

England, [Scotland,] Ireland. Perennial. Late Summer, Autumn.

Rootstock a small corm emitting elongated runners, which produce bulbs at their extremity, and from which new plants are developed. Early leaves all submerged or floating on the surface of the water, resembling the floating leaves of Sparganium simplex, but broader towards the apex, and having several ribs with lax areolation between them; later leaves rising out of the water, triangular, with 2 long acute basal lobes pointing backwards, commonly nearly as long as the rest of the lamina, which as well as the basal lobes has several ribs connected by cross veins. Scape at length rather longer than the leaves, with distant whorls with membranous bracts at the base; 1 or 2 of the lowest whorls consist of female flowers on peduncles rarely more than ½ inch long even in fruit; the two or three uppermost whorls of male flowers on peduncles ¾ to 1¼ inch long while the flowers are expanded. Flowers 3 (or 4) in a whorl. Female flowers about ½ inch across, the male ¾ inch, both with the inner perianth leaves diaphanous, pure white with a purple base, deciduous. Anthers dark purple. Fruit in heads ½ to ¾ inch in diameter, half-obovate-semicircular, flattened, thin, olive, with an apiculus forming a continuation of the upper margin, the greater portion consisting of a corky wing; seed-bearing portion oblong. Plant bright green, glabrous, very variable in the shape and size of the leaves and height of the scapes according to the depth of the water in which it grows; the former 2 inches to 1 foot long, including the basal lobes, the latter 4 inches to 2 feet 6 inches.

Common Arrowhead.

French, *Sagittaire flèche d'eau.* German, *Gemeines Pfeilkraut.*

This is a plant of remarkable beauty, and affords the finest example in nature of the arrowheaded leaf. Its roots contain an amylaceous matter, which is said to form a nutritious food, and is eaten by the Chinese and Kalmuk Tartars.

GENUS IV.—**ALISMA.** *Linn.*

Flowers perfect. Perianth with the 3 outer leaves herbaceous, subpersistent; 3 inner leaves larger, petaloid, caducuous. Stamens 6, hypogynous; filaments filiform; anthers introrse, affixed by the back. Ovaries very numerous, free, 1-celled and 1-ovuled; stigma simple. Fruit of numerous verticillate or subcapitate achenes.

Marsh herbs with a cormose rhizome and radical stalked leaves with cancellate venation, rounded, cordate or wedgeshaped at the base, sometimes with the lamina absent: occasionally the scapes root and produce leaves at the nodes. Flowers white or pale lilac, in a panicle on a scape with verticillate branches or pedicels.

The derivation of the name of this plant is said to be from the Celtic *alis*, water, where the species grow.

SECTION I.—EU-ALISMA. *Coss.*

Carpels flattened, with their sides wholly contiguous, arranged in 1 row on a flattened or depressed receptacle.

SPECIES I.—**ALISMA PLANTAGO.** *Linn.*

PLATES MCCCCXXXVII. MCCCCXXXVIII.

Billot, Fl. Gall. et Germ. Exsicc. No. 2744.

Leaves with the lamina ovate and subcordate or lanceolate and attenuated at the base, opaque, rising out of the water, rarely all submerged and linear-strapshaped and translucent, or some of them oblong-elliptical and floating; the early ones sometimes all submerged and translucent; the aerial or floating leaves with 5 to 7 ribs. Scape panicled, with whorled branches; the lower branches whorled or terminating in umbels. Flowers very numerous. Achenes in 1 row, in depressed roundish-trigonous umbilicate heads on a flattened receptacle, numerous, flattened, obovate, rounded at the apex, without a beak, with 1 or 2 furrows on the back; style situated on the upper margin, considerably below the apex.

Var. α, *genuinum.*

PLATE MCCCCXXXVII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. LVII. Fig. 100.
A. Plantago, *Bor.* Fl. du Centre de la Fr. ed. iii. Vol. II. p. 594.

Aerial leaves ovate, acuminate, cordate or subcordate at the base. Sepals oblong-ovate. Styles twice as long as the ovary.

Var. β, *lanceolatum.*

PLATE MCCCCXXXVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. LVII. Fig. 101.
A. lanceolatum, *With. Jord.* in *Schulz & Billot*, Archives, p. 322. *Bor.* Fl. du Centre de la Fr. ed. iii. Vol. II. p. 595.

Aerial leaves lanceolate, attenuated at each end. Sepals oval. Styles as long as the ovary.

In still water, and by the sides of ponds, ditches, &c. Common, and generally distributed, except in the extreme north of Scotland. Var. β apparently less common.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Rootstock a corm producing numerous stalked radical leaves, generally rising out of the water, but sometimes floating on the surface, and sometimes the leaves are all (or the earlier ones) reduced to phyllodia, as in the genus Sagittaria; lamina 1½ to 8 inches long, variable in breadth and in the shape of the base. Scape longer than the leaves, 6 inches to 3 feet high; the flowers in a large pyramidal panicle with spreading-ascending branches. Pedicels ½ to 1 inch long. Flowers ⅜ inch across; the outer perianth leaves subherbaceous, persistent; the inner ones pellucid, white or lilac, with a yellow base, soon fading. Heads of fruit trigonous, depressed, ¼ inch across. Achenes olive, very numerous. Plant bright green.

The extreme forms of vars. α and β look very different, but they are so connected by intermediate forms that I am unable to draw any line between them.

Greater Water-Plantain.

French, *Flûteau Plantain d'eau.* German, *Gemeiner Froschlöffel.*

This acrid, blistering plant is said to resemble the crowfoot in its general qualities. Cattle are sometimes seriously injured by eating it. The tubers are farinaceous, and in Russia are confidently recommended as a remedy in hydrophobia. Dr. Withering, though not professing any credence in the facts, gives a statement as to the use of this plant, furnished by Mr. Whitlaw. He calls it "a remedy for the poison of the rattlesnake," and says it was purchased by the Assembly of South Carolina of a negro, by giving him his freedom, and an annuity of 100*l.* for life. Mr. Whitlaw says, "In order to induce the faculty to give its virtues a fair trial as an antispasmodic, I may observe that I have frequently seen cattle, which have eaten the *Alisma*, completely paralysed, so that they could not stand. As death ensues from the excessive stimulant action of the poison of the rattlesnake, and of the saliva of a rabid animal upon the muscular system, I consider that a cure is effected by the peculiar sedative power of the *Alisma* or antispasmodic relaxing the spasms, and I believe it will be found to be an effectual specific for the cure of these two dreadful maladies, as also of tetanus. The best mode of administering it, when the difficulty of swallowing comes on, is to scrape about an ounce of the solid root, and let it be eaten between two slices of bread. The dose to be repeated in an hour, if the spasms are not relieved."

SECTION II.—BALDELLIA. *Parlat.*

Carpels fusiform-ovoid, with their sides not contiguous, arranged in several rows on the globular receptacle.

SPECIES II.—**ALISMA RANUNCULOIDES.** *Linn.*

PLATES MCCCCXXXIX. MCCCCXL.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. LV. Fig. 97.
Billot, Fl. Gall. et Germ. Exsicc. No. 3216.
Baldellia ranunculoides, *Parl.* Fl. It. Vol. III. p. 596.

Leaves with the lamina narrowly elliptical or strapshaped-elliptical, gradually attenuated at both ends, opaque, rising out of the water;

the early ones all submerged, translucent and narrower, very rarely some of them floating; the aerial ones with 3 ribs. Scape racemose, with whorled and umbellate pedicels, or only the latter. Flowers numerous. Achenes in several rows in a globular head on a subglobular receptacle, half-obovate-fusiform-prismatic, acuminated at the apex into a short beak, with 4 corky ribs; the back with a corky keel.

Var. α, *genuina.*

PLATE MCCCCXXXIX.

A. ranunculoides, *Sm.* Engl. Bot. ed. i. No. 362. *Kunth.* Enum. Plant. Vol. III. p. 149. (Excludo var. β.)

Scapes leafless, erect or ascending, without roots at the point where peduncles are given off.

(?) Var. β, *repens. Sm.*

PLATE MCCCCXL.

A. repens, *Davies,* Welsh Bot. p. 36. *Kunth.* Enum. Plant. Vol. III. p. 150. *Bor.* Fl. du Centre de la Fr. ed. iii. Vol. II. p. 596.

Scapes, or at least some of them, decumbent, rooting and producing tufts of leaves at the points where the pedicels are given off.

In ditches and shallow pools. Not very common, but generally distributed, except in the north of Scotland. Var. β, in Anglesea and on the margins of several lakes in North Wales: not unfrequent in Ireland.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Rootstock a very minute corm producing short lateral shoots close to the parent, so that the plant grows in tufts. Early leaves scarcely stalked, translucent, 1-ribbed; later leaves on stalks sufficiently long to raise them out of the water; lamina 1 to 4 inches long, always attenuated towards the base, thinner and smoother than that of A. Plantago, and with never more than 3 ribs. Scape rising out of the water, more or less curved near the base; the upper part erect or ascending; the length varying from 2 inches to 2 feet. Pedicels at length 1½ to 3 inches long, numerous in each whorl, and in the umbel which terminates the scape: sometimes all in a terminal umbel. Flowers ⅔ inch across, white or pale lilac, soon fading. Heads of fruit about the size of peas. Achenes olive, numerous. Plant bright green, somewhat shining.

Var. β has the leaves shorter, narrower, and less distinctly stalked, but is chiefly remarkable for the scapes rooting and producing new plants at the nodes, with the number of pedicels at each node rarely above 2 or 3, and often they are solitary. It is now generally considered a mere variety, but it would be desirable to raise it from seed to make it certain that its peculiarities are not constant.

Lesser Water-Plantain.

French, *Flûteau renoncle.* German, *Hahnenfussartiger Froschlöffel.*

SPECIES III.—ALISMA NATANS. *Linn.*

PLATE MCCCCXLI.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. LIV. Figs. 95 and 96.

Radical leaves reduced to linear attenuated translucent phyllodia, very rarely stalked, with an oval subcarious lamina; leaves near the extremity of the scape (or rather stem), stalked, elliptical or oval or oblong-elliptical, wedgeshaped at the base, obtuse, floating, subcoriaceous, 3-ribbed. Stem filiform, submerged, commonly rooting at the nodes, the lower nodes with narrow leaves resembling the radical ones; the upper part racemose, with solitary or opposite (rarely whorled) pedicels, and a terminal umbel of about 3 flowers. Flowers very few Achenes in few rows in a globular head on a subglobular receptacle, obovate-oblong-fusiform, abruptly acuminated at the apex into a short beak, with 12 to 15 slender ribs.

In lakes. Rare. It has been reported from the counties of Worcester, Salop, Hereford, Glamorgan, Merioneth, Carnarvon, Anglesea, York, Cumberland, and Wigton; of which Shropshire, the Welsh counties, and York are the only ones which have been recently verified. Rare and local in Ireland, and confined to the west of the island.

England, Scotland (?), Ireland. Perennial. Late Summer, Autumn.

Radical leaves submerged, 1½ to 8 inches long, tapering gradually from the base to the apex, rarely, when the plant grows on mud, stalked, with the lamina subcoriaceous and oval. Stem (which is evidently the representative of the scape of A. ranunculoides) floating, varying from 3 inches to 2 feet according to the depth of the water, with roots and leaves at the nodes as in A. ranunculoides var. repens; the upper leaves almost always floating, oval, elliptical or oblong, ½ to 1 inch long, resembling in texture those of Potamogeton polygonifolius, the lateral ribs close to the margin. Pedicels solitary or 2 (rarely 3) from each node, the terminal umbel 3- rarely 5-flowered. Peduncles at length 1 to 3 inches long. Flowers about ½ inch across, resembling those of A. ranunculoides, white with a yellow eye. Carpels 6 to 15, in a smaller and laxer head than in A. ranunculoides, more abruptly beaked, and with the ribs more slender and much more numerous.

Floating Water-Plantain.

French, *Flûteau nageant.* German, *Schwimmender Froschlöffel.*

GENUS V.—**ACTINOCARPUS.** *R. Br.*

Flowers perfect. Perianth with the 3 outer leaves herbaceous, subpersistent, the three inner rather larger, petaloid, caducous. Stamens 6, hypogynous; filaments filiform; anthers introrse, affixed by the back. Ovaries 6 or 8 in a whorl, united at the base, free at the apex; stigma simple. Fruit 6 or 8 indehiscent beaked carpels united at the base, the apices spreading in the form of a star, each containing 2 or more seeds or only 1 by abortion of the other ovules.

Aquatic or marsh plants with oblong stalked leaves, floating when the plant is immersed, or erect when it grows out of water. Flowers white, in a raceme on a scape with verticillate branches.

The derivation of the name of this genus of plants is from ἀκτίς, a ray, and καρπός fruit.

SPECIES I.—**ACTINOCARPUS DAMASONIUM.** *Hook.*

PLATE MCCCCXLII

Alisma Damasonium, *Linn.* *Sm.* Engl. Bot. ed. i. No. 1615; and Engl. Fl. Vol. II. p. 204.

Damasonium stellatum, *Pers.* *Kunth.* Enum. Pl. Vol. III. p. 155. *Benth.* Handbk. Brit. Bot. ed. ii. p. 446. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 167.

Leaves oblong or oval-oblong, cordate or subcordate. Raceme with 1 to 4 whorls of flowers. Pedicels not thickened, longer than the follicles. Follicles 2-seeded or 1-seeded by abortion, the beak without prominent nerves.

In pools, especially on gravelly soil. Rare. Reported from Gulval Marsh, near Penzance, on the authority of the late Rev. W. S. Bree; but, as no other botanist has found it there, it is probably extinct in that locality. It used to grow about two miles from Christchurch, on the Lyndhurst Road, Hants; but has not, so far as I know, been gathered there recently. Near Tunbridge Wells, Sussex. Not uncommon on the commons in Surrey, and in Epping Forest, Essex, and the adjoining district as far east as Warley; Framlingham, Suffolk; Dropmore Common, Herts; and Ellesmere, Salop; formerly on Hounslow Heath, Middlesex, and Wingfield Plain, near Windsor, Berks.

England. Perennial (?). Summer, Autumn.

Rootstock a slightly thickened corm, producing tufts of radical leaves on scapes which flower in succession. Leaves stalked, floating when the plant grows in water, ascending or erect when on mud; petiole variable in length; lamina 1 to 3 inches long, 3- to 5-nerved, usually slightly cordate at the base, obtuse, when floating resembling the leaves of Potamogeton polygonifolius, but of a brighter green. Scapes leafless, 3 inches to 2 feet high, bearing a raceme of usually 2 or 3 whorls of flowers with membranous bracts at the base of the pedicels, which are generally numerous in each whorl, and lengthen after flowering until they are 1 to 2 inches long. Flowers about $\frac{1}{4}$ inch across; outer perianth leaves green, deciduous; inner ones white with a yellow spot at the claw, very caducous. Fruit of 6 (more rarely 5 to 8) follicles, united at the base and with subulate beaks spreading like the spokes of a wheel, but slightly ascending, each follicle about $\frac{1}{2}$ inch long, opening at length by the ventral suture. Seeds narrowly oblong, grooved, transversely-rugose, pitchy-chestnut colour, about $\frac{1}{10}$ inch long, normally 2, but often only 1 by the abortion of the second ovule.

Thrum Wort.

French, *Flûteau étoilé.*

SUB-ORDER III.—BUTOMEÆ.

Perianth with the segments all nearly similar and petaloid, or the 3 outer ones herbaceous. Stamens 9 or more. Ovules numerous in each cell of the ovary. Embryo straight or hooked.

GENUS VI.—**BUTOMUS.** *Tournef.*

Perianth of 6 persistent concave petaloid segments; the outer ones subherbaceous on the back. Stamens 9, subhypogynous, in pairs opposite the outer perianth segments, and solitary opposite the inner ones; filaments narrowly subulate. Ovary consisting of a whorl of six 1-celled carpels cohering at the base; ovules numerous in each carpel; styles forming a beak to the carpels; stigmas simple. Fruit of 6 follicles, cohering at the base, opening by the ventral suture.

A marsh herb with radical linear somewhat bayonet-shaped leaves, and simple cylindrical scapes bearing a bracteated umbel of numerous rose-coloured flowers.

The derivation of the name of this genus of plants is from βοῦς, ox, and τέμνω, I cut, being supposed to injure the mouths of cattle.

SPECIES I.—BUTOMUS UMBELLATUS. *Linn.*

PLATE MCCCCXLIII.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. LVIII. Fig. 103.

The only known species.

In ditches, ponds, and at the sides of rivers. Not very common, but generally distributed in England, except in the north. At Howick, Northumberland, it is believed to be introduced, and is certainly so in Duddingston Loch, Edinburgh, and the Loch of Clunie (Perthshire ?). Local and rare in Ireland, but extending from the south to the north-east.

England, [Scotland,] Ireland. Perennial. Summer, early Autumn.

Rootstock thickened, fleshy, extensively creeping, producing long radical triquetrous leaves with enlarged bases sheathing the rhizome, in appearance somewhat resembling those of Sparganium rumosum, but much narrower and more or less twisted, shorter than the scape. Scape 2 to 4 feet high, terete, bearing a terminal many-flowered umbel, which in bud is enclosed in an involucre of 3 ovate-acuminate scarious leaves more or less tinged with purple. Pedicels at first very short, afterwards elongating till they are 2 to 4 inches. Flowers saucer-shaped, $\frac{3}{4}$ to 1 inch across. Perianth segments concave, whitish tinged with pale rose in the inside, dark purplish rose in the middle of the back, where the 3 outer ones are faintly tinged with green. Anthers dull red. Ovaries rose colour. Capsules surrounded by the withered perianth and stamens, of 6 coherent inflated follicles with long beaks formed by the persistent styles. Seeds very numerous. Plant pale bright green. Stems and leaves filled in the interior with lax spongy tissue.

Flowering Rush.

French, *Butome en ombelle.* German, *Doldenblüthige Schwanenblume.*

This beautiful plant is one of the stateliest and most elegant of English aquatics—improperly called a rush, though the similarity of its long smooth stalk to that of the bulrush sufficiently accounts for the error. Gerard, who suggests the name of "Lillie Grasse," calls it the Water Gladiole or Grassie Rush, and says that of "all others it is the fairest and most pleasant to behold, and serveth very well for the decking and trimming up of houses, because of the beautie and braverie thereof; consisting of sundry smale flowers compact of sixe smale leaves, of a white colour mixed with carnation, growing at the top of a bare and naked stalk, five or six foote long, and sometime more." It is one of the greatest ornaments to our rivers and ponds, and poets sing its praises:—

> "Her rosy umbels rears the Flowering Rush,
> While with reflected charms the waters blush."

The seeds and roots were formerly used medicinally, and in the north of Asia the roots are roasted and eaten.

ORDER LXXIX.—HYDROCHARIDACEÆ.

Aquatic herbs generally perennial, submerged, or with the upper leaves floating; the flowers rising out of the water, or at least to the surface, at the time of fertilisation. Rootstock with runner-like stolons producing a new plant at their extremity, more rarely soboliferous. Leaf-bearing stem undeveloped or elongated and branched. Leaves all radical or opposite or verticillate; when submerged, pellucid, simple, undivided; when the lamina is stalked it is often cordate at the base; venation generally cancellate. Flowers commonly diœcious, rarely polygamous, enclosed in a spathe of 1 to 3 bracts while in bud. Male flowers usually several, rarely solitary, enclosed in a 1- or 2-leaved spathe: perianth of 6 (rarely 3) segments; the 3 outer generally herbaceous; the 3 inner petaloid, rarely absent: stamens inserted at the bottom of the perianth, 3, 6, 9 or many, some of them frequently sterile; filaments free or monadelphous; anthers introrse, rarely extrorse, 2-celled: ovary rudimentary. Female and perfect flowers solitary, from a tubular spathe: perianth with a tube united to the ovary; limb 6-partite, rarely 3-partite; the 3 outer segments generally herbaceous; the 3 inner petaloid, rarely absent: stamens without anthers, or (in the perfect flowers) with anthers similar to those of the male flowers: ovary inferior, adnate to the tube of the perianth, of 3, 6, or 9 carpels, and generally of as many cells as carpels, sometimes 1-celled when there are 3 carpels, and in that case with 3 parietal placentæ; ovules numerous; placentæ gelatinous, usually on the dissepiments in the multilocular ovaries; styles short or sometimes elongated and connate, with the tube of the perianth as many as the number of the carpels; stigmas entire or 2-cleft. Fruit ripening under water, indehiscent, herbaceous. Seeds numerous, indefinite; testa membranous, very often clothed with spiral fibres; albumen none; radicle pointing towards the hilum or away from it.

GENUS I.—HYDROCHARIS. *Linn.*

Flowers diœcious. Male flowers usually 3 in an umbel, pedicellate from a 2-leaved membranous spathe supported on a scape: perianth of 6 leaves, the 3 outer leaves oval, subherbaceous; the 3 inner larger, suborbicular, and petaloid: stamens 12; filaments united at the base, forked at the apex, 9 only (or more rarely 6) of them with anthers which are attached to the posterior fork of the filament: ovary rudimentary, 3-lobed. Female flowers solitary, longly pedicellate from a 1-leaved sessile membranous spathe: tube of the perianth herbaceous, adherent to the ovary, and not extending above it; limb 6-partite, the 3 outer segments oval and subherbaceous, the 3 inner larger, suborbicular, petaloid, and with a fleshy scale at the base: stamens 6, abortive, reduced to subulate filaments placed in pairs opposite the exterior leaves of the perianth: ovary adhering to the tube of the perianth, 6-celled; ovules numerous in each cell; style very short, thick, single; stigmas 6, each of them bifid. Fruit an ovoid subherbaceous berry with 6 cells, and numerous seeds attached to the walls of the dissepiments.

An aquatic stoloniferous herb, with floating stalked roundish-reniform leaves, the petioles sheathing and auriculate at the base. Flowers rising out of the water, large, with delicate white inner perianth segments. Fruit submerged.

The name of this genus of plants comes from the two Greek words, ὕδωρ, water, and χάρις, delight, the pride of the water.

SPECIES 1.—**HYDROCHARIS MORSUS-RANÆ.** *Linn.*

PLATE MCCCCXLIV.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. LXII. Fig. 112.
Billot, Fl. Gall. et Germ. Exsicc. No. 2937.

The only known species.

In ditches and ponds. Not very common, but generally distributed over England, except in the extreme north, and common in the fens of the eastern counties. Rare and local in Ireland, and found chiefly in the middle and north of the island.

England, Ireland. Perennial. Late Summer.

Root-fibres very long. Rootstock with more or less elongated runner-like stolons, producing at their apex new plants, which are at first developed as ovoid bulbs, the new plants thus formed again producing runners, so that late in the year a chain of plants exists, as in the strawberry. Leaves floating, all with stalks 1 to 6 inches long; lamina orbicular, ¾ to 2 inches in diameter, entire, the base deeply cordate, with incumbent lobes: when young the leaves are rolled up like those of Potamogeton natans, but soon become quite flat, subcoriaceous, shining and green above, dim and often purple beneath. Stipules scarious, transparent, their base adnate to the leaf-stalks. Male flowers 1 to 1¼ inch across; spathe on a peduncle 1 to 2 inches long, membranous, containing 1 to 3 flowers in an umbel; pedicel of the male flowers 1¼ to 1½ inch long: sepals oblong, subherbaceous: petals orbicular, pure white: stamens yellow. Female flowers solitary from a sessile axillary spathe, on pedicles 2 to 4 inches long: tube of the perianth wholly adnate to the ovary, about ¼ inch long, herbaceous; limb of the perianth similar to that of the male flowers. The fruit is apparently rarely perfected, as, though I have frequently looked for it, I have never been able to find it mature: it is described as being ovoid, attenuated at the apex, 6-celled, and with a somewhat fleshy pericarp.

Frog's-Bit.

French, *Morène aquatique.* German, *Gemeiner Froschbiss.*

The popular name of this pretty plant, the Pride of the Water, is well deserved. The pearly white blossoms are very ornamental to our quiet streams and ponds in the summer months, and, though not universally distributed, it is very common in some counties. This is one of the most desirable plants for the fresh-water aquarium.

GENUS II.—**STRATIOTES.** *Linn.*

Flowers diœcious or polygamous. Male flowers 1 to 3 or more, pedicellate, from a 2-leaved herbaceous spathe supported on a scape: perianth of 6 leaves, the 3 outer oblong, subherbaceous, the 3 inner larger, suborbicular, petaloid : stamens indefinite ; filaments free, subulate, 12 only (or 13) of them with anthers. Female or subperfect flowers solitary, sessile, from a 2-leaved herbaceous spathe supported on a scape : tube of the perianth herbaceous, adnate to the ovary, and extending above it; limb 6-partite, the 3 outer segments oblong-oblanceolate, subherbaceous, the 3 inner larger, obovoid, petaloid : stamens numerous, usually all abortive, and reduced to subulate filaments, or some of them with imperfect or perfect anthers ; ovary adnate to the tube of the perianth, attenuated upwards, 6-celled; each cell with numerous ovules; style short, cylindrical, adnate to the tube of the perianth ; stigmas 6, each of them bifid. Berry hexagonal, ovoid, 6-celled. Seeds few, attached to the walls of the cells.

An aquatic stoloniferous herb, with more or less submerged, linear, tapering, fleshy, brittle leaves, with spinous edges, bearing resemblance to those of an aloe. Flowers at length rising out of the water, with large delicate white inner perianth segments. Fruit submerged.

The name of this genus of plants is said to be derived from the Greek word *στρατός*, an army, because the plant was believed to cure all wounds made by iron weapons. Other authors say it is derived from *στρατιώτης*, a soldier, or perhaps *στρατός*, in reference to its crowded sword-like leaves.

SPECIES I.—STRATIOTES ALOIDES. *Linn.*

PLATE MCCCCXLV.

Reich. Ic. Fl. Germ. et Helv. Vol. VII. Tab. LXI. Fig. 111.

The only known species.

In ditches and ponds. Rare and doubtfully native, except in the east of England, from Suffolk to York. Perhaps indigenous also in Lancashire and Cheshire. In Scotland it has long been naturalised in Duddingston Loch and near Corstorphine, Edinburgh, and in the Lochs of Cluny and Forfar. In Ireland it is very doubtfully indigenous, though naturalised in a good many places, and perhaps native in the lakes and ditches of Cavan and Fermanagh.

England, [Scotland,] Ireland (?). Perennial. Late Summer.

Root-fibres elongated. Rootstock stoloniferous, producing new plants on runners in the same manner as Hydrocharis. Leaves numerous in each tuft, sessile, 4 to 18 inches long, linear, tapering towards the apex, keeled below, channeled above, half sheathing at the base, acute, serrate, brittle, lurid-green or brownish-maroon; the outer ones recurved; the inner erect. Peduncles axillary, shorter than the leaves. Spathe subherbaceous, 2-leaved, the leaves keeled on the back. Male flowers (which I have not seen in British specimens) 1 to 3 from each spathe, pedicellate, 1½ inch across, pure white: stamens yellow. Female flowers in spathes similar to those of the male flowers, but the flowers are sessile and solitary; tube about 1¼ inch long, the base adhering to the ovary, the upper part produced beyond it: stamens numerous, some of them often fertile, so that the female plant alone frequently fruits. Capsule bent at right angles to the peduncle, subherbaceous, flask-shaped, 6-celled and 6-angled. Seeds numerous, contained in membranous pulp.

Water Soldier.

French, *Stratiote aloès.* German, *Aloeblättrige Krebsscheere.*

This plant is easily recognised by the similarity of its foliage to that of an aloe. In the autumn the plants sink to the bottom of the water, and in the spring, from amongst the leaves of the old plants, arise numerous thick suckers, each bearing a young plant which floats on the surface, where it grows to maturity. It grows very rapidly, and is a desirable plant to cultivate in ponds and still rivers.

GENUS III.—ELODEA.* *Rich.*

Flowers diœcious or polygamous. Male flowers solitary, sessile, from a 2-lipped axillary sessile spathe; perianth of 6 segments, the

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* This ought to be Helodea. I follow Mr. Bentham in placing this plant in this genus; though I believe Hydrilla to be the proper name; there being no characters of sufficient importance to separate the genera "Hydrilla," "Elodea," and "Anacharis."

3 outer oblong, hooded, subherbaceous, the 3 inner scarcely larger, oblong, subpetaloid: stamens 9, more rarely 3; filaments short and monadelphous, or absent. Female flowers solitary, sessile, from a 1-leaved sessile axillary spathe, which is 2-toothed at the apex; tube of the perianth coloured, adhering to the ovary, and extending to a great length beyond it; limb 6-partite, the 3 outer segments oblong, hooded, herbaceous, the 3 inner scarcely larger, oblong, reflexed, petaloid: stamens 3 or 6, usually reduced to sterile filaments, rarely with subsessile anthers: ovary adhering to the base of the tube of the perianth, 1-celled, with 3 parietal placentæ, each of which bears a few ovules; style single, very long, capillary, adnate to the tube of the perianth; stigmas 3-notched or bifid. Fruit "oblong, coriaceous, few-seeded." (*Gray.*)

Stems submerged, brittle, with verticillate ovate or oblong or strap-shaped leaves and minute flowers, the female with the lilac perianth limb resting on the surface of the water. The male flowers are said to break off and float on the water; but they are unknown in this country.

Name derived from ἑλῶδες, marshy.

SPECIES I.—ELODIA CANADENSIS. *Michaux.*

PLATE MCCCCXLVI.

Anacharis Alsinastrum, *Bab.* in Ann. Nat. Hist. Ser. II. p. 83. Engl. Bot. Suppl. No. 2993. Man. Brit. Bot. ed. vi. p. 323.
A. Alsinastrum, A. Nuttallii, and A. Canadensis, *Planch.* in Ann. Nat. Hist. Ser. II. Vol. I. p. 86.
Udora Canadensis, *Nutt.* Gen. N. Americ. Pl. Vol. II. p. 242.
Apalanthe Schweinetzii, *Planch.* Ann. Nat. Hist. Ser. II. Vol. I. p. 87.

Leaves in verticils of 3 (more rarely 4) or the lower ones opposite, oval-oblong or ovate-oblong or lanceolate-oblong or strapshaped, very finely and obscurely serrulate. Stigmas reflexed, often 3-lobed.

A North American plant, noticed in 1842, in a pond at Dunse Castle, Berwickshire, by the late Dr. G. Johnston; from thence it spread to the River Whitadder, and probably from the same place was carried to the pond in the Botanic Garden at Edinburgh, whence it has been taken to other places in the neighbourhood. Shortly before the year 1847, it appears to have been introduced with timber from North America to the canal basin at Foxton, near Market Harborough, Leicestershire; and from this second centre it has now spread over the greater part of England. In Ireland, at the date of the publication of the "Cybele Hibernica," 1866, it was still rather local, but spreading over the country, being first noticed by Mr. John New, at "Waringstown, co. Down, about the year 1836." The female plant alone is known to occur in Britain.

(England), (Scotland), (Ireland). Perennial. Summer, Autumn.

Plant wholly submerged, the branches rising to the top at the time of flowering, the flowers resting on the water but not rising out of it. Stem slender, cylindrical, brittle, much branched, emitting roots at the nodes. Whorls rather distant below, approximate towards the apex of the branches, mostly with 3 leaves on each, but sometimes with 4, the lowest nodes with the leaves sometimes opposite. Leaves slightly amplexicaul, ¼ to ½ inch long, variable in breadth, bright green, translucent, with a thickened midrib, finely serrulate on the margins. Spathe axillary, from one or more of the whorls towards the extremity of the branches, clavate-cylindrical, split at the apex, membranous. Tube of the perianth 2 to 8 inches long, filiform. Flowers about ⅕ inch across, pale lilac. Sepals concave. Petals at length reflexed. Filaments strapshaped, without anthers. Stigmas papillose. The male plant or the fruit I have never seen, and even in America it appears to be much less common than the female, which there has the flowers with the stamens apparently perfect.

Dr. Asa Gray says that the male flowers break off and float on the surface, as in Vallisneria.

When grown in an aquarium I have seen it with leaves as narrow as those of Callitriche autumnalis.

Water-Thyme.

The history of this curious water plant is very interesting, and has given rise to much discussion among botanists as to its introduction into this country. It is the *Anacharis Alsinastrum* of the first and subsequent editions of Babington's "Manual of British Botany." More recently it has been identified with a well-known North American plant, and referred to the genus *Elodia*, by Mr. Bentham and others. We are indebted to Mr. W. Marshall, of Ely, for a very careful collection of facts bearing on the discovery of this plant, and its claim to be considered a British native, in four letters published originally in the "Cambridge Independent Press," and afterwards in the "Phytologist" of 1852. These letters were also published in a separate form, and through Mr. Marshall's kindness we are able to avail ourselves of them fully. This weed was first found in this country on the 3rd of August 1842, by Dr. George Johnston, of Berwick-on-Tweed, in the Lake of Dunse Castle, in Berwickshire. Specimens were sent to Mr. Babington, but the discovery was lost sight of, and the interest died away until the autumn of 1847, when it was again discovered by a lady, Miss Kirby, of Market Harborough in Leicestershire. The plants were all females, and were closely matted together in great abundance. Miss Kirby had not observed it there before, and the reservoirs had been cleaned out two years previously. Miss Kirby's rediscovery awakened the attention of botanists to the subject, and Mr. Babington published a description of the plant in the "Annals of Natural History" for February 1848, in which he advocates the notion that *Udora* is a true native, and not, as is since pretty generally believed, an introduction from the American continent. Almost at the same time other observers discovered the plant in various situations, having had their attention drawn to it by Mr. Babington's paper. Dr. Johnston found it in two places in the Whitadder River. Mr. James Mitchel writes that in the Lene, a tributary of the Trent, near Nottingham, it was "growing in great profusion for about a quarter of a mile in extent." In November of the same year it was found in Northamptonshire, in the Watford Locks, by Mr. Kirk, in great abundance. He considered it to be an introduced plant at that time, but afterwards changed his views, from its simultaneous discovery in so many other localities. All his specimens were female, and growing in such dense masses that it was with difficulty good-sized specimens could be detached, from its extreme brittleness. Mr. Kirk was informed by the lock-man that the plant was quite as abundant when he first came to the lock five years before, although the reservoir had been cleaned out once or twice during that period. The lock-man further stated that he had formerly resided at Foxton Locks, and that the reservoirs there were full of it "more than twenty years back;" also that it had been plentiful in the Market Harborough Canal during the whole of that period. A short time after this conversation took place two labourers belonging to the lock came up, and both of them confirmed the statement of its being plentiful in the Market Harborough Canal, and one of them added that the "Welford Branch," a narrow canal comparatively little used, was so full of it that "the passage of boats was impeded, and the canal necessitated to be cleared out once or twice a year, and that it had been so for many years." Mr. Marshall believes there was some mistake here, and it is well to remember that the evidence of persons unaccustomed to observe is of very small value in natural phenomena. The plant seen by the lock-men may have been altogether a different species, but that it was a fast-growing water-weed would be enough to account for their confusion. Scientific data are founded on the observations of competent witnesses only. In August 1849, the Anacharis was found in Derbyshire and Staffordshire by Mr. Edwin Brown, growing in profusion in the Trent. He was convinced that the plant was new to that locality. All the plants were female. In Christmas 1850, it was found by Mr. Kirk in Warwickshire, near Rugby, in the greatest abundance; and in July 1851, by the same gentleman in the Oxford Canal, near Wyken Colliery. The Rev. W. Hind, writing from Burton-on-Trent in July 1851, describes the plant as having greatly increased in eighteen months, and says "it bids fair to block up one of the two streams into which the Trent here divides." In 1851 Mr. Marshall and others noticed the plant in the river between Ely and Cambridge, but not in large quantities. Since then it has increased so rapidly and wonderfully that it has become the greatest source of annoyance to all watermen, and navigation seems almost to be arrested by it. Sluice-keepers complain that masses of it get into the pen, and retard the operation of letting boats through very greatly. The railway dock at Ely became so choked with it recently that several tons of it had to be lifted out. Rowers complain sadly of it, and the University oars find it so prejudicial to their progress, that, giving their Professor of Botany the credit or blame of introducing it into their river, they called it *Babingtonia pestifera*.* Besides the annoyance that this weed is to boatmen and fishermen, the drainage is considerably impeded by it, and it is therefore a question of great importance as to how its rapid increase can be arrested. The arguments for the origin of this plant in our rivers, or in those of a foreign country, have been carefully weighed by Mr. Marshall, and he does not hesitate to say that he believes it to be a genuine foreigner, brought here most probably from North America. He thinks that since its first discovery in the lock at Dunse Castle in 1842 it has gradually been drifted by streams or canals into most of our Midland rivers. Its extraordinary increase of late years is an argument in favour of its foreign origin; for, if it be not a new plant in our own rivers, how is it that it never before exhibited this remarkable property of rapid increase? If it be a native, this new faculty has been recently imparted to it—which seems absurd. But allowing, as we must, that it is an introduced plant, and did not exist at all in our rivers till a few years ago, we are curious to know how it got here. Possibly some ardent botanist, amongst specimens received from other lands, may unwarily have let fall into a piece of water some fragment of this inveterately growing weed; or we may receive Mr. Marshall's suggestion, that it was brought over in some American timber used in the construction of some of the numerous railways which culminate at or near Rugby. We know that American timber is floated in rafts down the rivers, in which case fragments of the weed would adhere to it, or seeds might find their way into the crevices of the wood, and if but one fragment of the plant or but one seed in some moist cranny retained its vitality till it reached England, it is quite sufficient to account for the myriads of individuals now existing in our rivers and ponds. "Indeed, from the circumstance of all the plants hitherto found being of one sex, the theory of its propagation from a *single* seed or fragment is rendered more probable than by supposing a number of seeds or fragments to have been imported." But an interesting question occurs as to how the troublesome weed came to establish itself in the Cam, the classic stream which ought to be safe from such intruders. Mr. Babington tells us that in 1847 a specimen from the Foxton Locks was planted in a tub, in the Cambridge Botanical Garden, and in 1848 the late Mr. Murray, the curator, placed a piece of it in the Conduit stream that passes by the new garden. In the following year, on Mr. Babington asking what had become of the stick which marked the site of the plant, he was informed that it had spread all over the ditch. "From this point," says Mr. Marshall, "it doubtless escaped by the waste-pipe across the Trumpington Road, into the 'Vicar's Brook,' and from thence into the river above the mills, where it is now found in the greatest profusion. In the case of the Cam, then, we see it proved to demonstration that the short space of four years has been sufficient for one small piece of the Anacharis to multiply so as to impede both navigation and drainage." When Professor Gray, of Boston, U.S., was at Cambridge, this circumstance was mentioned to him, and he expressed his surprise, as the Anacharis is not found to spread in this very rapid manner in America. Perhaps our sluggish streams, the decomposing animal and vegetable matters in the Cambridge waters, and especially the excess of lime present, may be favourable to its development and form an inexhaustible supply of inorganic food for its nourishment and support. The great practical question arising from all this seems to be, How is it to be got rid of? We quote Mr. Marshall's conclusions on this point. He says, in answer to the question, emphatically, "NOT AT ALL! Like the imported European horses and oxen in the South American pampas, or Captain Cook's pigs in New Zealand, or the Norway rat in our own farm-yards, or the Oriental black-beetle in London kitchens, or (more remarkable still) like the exotic mollusc (the *Dreissena polymorpha*) which has now spread itself through the canals of this country, we may conclude it has fairly established itself amongst us, *never to be eradicated.* All we shall be able to do is to try and keep it down; and in order to effect this, it should not be left in the rivers after it has been cut, in the hope of its finding its way into the sea, but be raked out at once upon the shores; and the Commissioners of Drainage should beware of letting fresh water into their districts, for the weed will inevitably enter with it and blockade the ditches." Since Mr. Marshall wrote the above, in 1852, his prophecy has been fulfilled. Every ditch near the Cam or its source is full of this weed, and the river itself is so choked up with it that it has become a serious nuisance, and we are not sure that the recent failures of the gallant University crew in the annual boat-race may not be attributed in some measure to the disadvantages under which they train and practice on their own river.

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* Professor Babington did not introduce it at Cambridge. See p. 84, line 24, *et seq.*—ED.

So strong is the conviction on the minds of those most interested in this question that some energetic means should now be taken to cleanse and purify the beautiful river of which generations have been so proud, that while we are now writing (August 1868) a committee of gentlemen has been formed, and is now actively at work collecting funds for that purpose, and organising improvements which will cost several thousand pounds to achieve.

The *Elodea* is one of the best plants for the fresh-water aqua-vivarium. It grows rapidly, and oxygenates the water freely. In common with many other water plants —such as *Chara* and *Vallisneria*—it exhibits a very interesting structure under the microscope, and is an evident instance of the circulation of the sap in plants. The vessels, when properly placed under an object-glass of medium power, exhibit this curious phenomenon very distinctly.

ORDER LXXX.—**ORCHIDACEÆ.**

Perennial herbs with fasciculate roots; in the terrestrial species often with two of the root-fibres enlarged into subglobular-ovoid or palmated tubers, a new one, terminated by a bud, being formed each year, and the one formed in the preceding year decaying; so that of the two tubers present one is exhausted, and the other contains nourishment to produce the stem of the succeeding year. Rootstock in the tuberous species blended with the tubers; in the others sometimes creeping, or sometimes forming a cormlike enlargement surrounded by coats, so as to be intermediate between a corm and a tunicated bulb. Stem generally unbranched, leafy, or rarely with scarious scales in place of leaves. Leaves often mostly radical, sheathing at the base, entire, parallel or cancellate-nerved, rarely reticulate; stem-leaves alternate or rarely opposite. Flowers perfect, irregular, in spikes or racemes or corymbs, rarely paniculate or solitary, each with a single bract. Perianth with an herbaceous tube adhering to the ovary; limb of six segments in two rows, usually all petaloid, free or more or less coherent, the anterior segment (which, from the ovary or pedicel twisting half round, is, in most of the British species, apparently the lowest or posterior segment) almost always differing from the others in shape and direction, and termed the *labellum* or lip; in several of the genera with a spur at the base. Essential organs combined into a central column or *gynosteme* opposite the lip. Stamens 3, but the 2 lateral ones generally abortive, and the one next the labellum only bearing an anther, though in one genus this is abortive and the two lateral stamens are antheriferous; anthers 2-celled, sometimes with the septum incomplete, sometimes 4-celled, from the production of secondary septa, or rarely with 8 cells; pollen often waxy, cohering in masses (*pollinia*) which are frequently attached to the stigma by a stalk (*caudicule*), by a gland (*retinacule*) of the stigma contained in a pouch (*bursicule*), more rarely the pollen is powdery, as in the majority of plants. Ovary inferior, adnate to the tube of the perianth, 1-celled with 3 parietal placentæ; ovules indefinite, anatropous; style forming part of the column with the stamens, very rarely partially free; stigma a viscid space in front of the column, sometimes extended into a process (*rostellum*) bearing the pouches which contain the glands to which the bases of the caudicules of the pollinia are affixed when these are present. Capsule dry, rarely a berry, opening by 6 slits, which have 3 seed-bearing valves alternate with 3 narrow ribs to which no seeds are attached, and which commonly persist for some time after the seed-bearing valves decay. Seeds very numerous and minute, with a lax reticulated integument produced beyond each end of the solid part, more rarely with the integument adhering closely to the solid part, or very rarely with a crustaceous integument; albumen none; embryo fleshy, with the radicle next the hilum.

TRIBE I.—OPHRYDEÆ.

Anther 1, wholly adnate to the column, persistent; pollen masses stalked, consisting of waxy cohering granules.

GENUS I.—**ACERAS.** *R. Br.*

Sepals and lateral petals connivent; labellum turned downwards, not spurred at the base. Anther wholly adnate to the column; its 2 cells converging at the base, and each containing a stalked pollen-mass; caudicules affixed to a common gland included within a pouch. Stigma with a rostellate process extending within the bases of the anther-cells.

A herb with ovoid or subglobular root-fibres, only differing from Orchis in the want of a spur to the labellum.

The derivation of the name of this genus is thus given—from ἀ, not, and κέρας, a horn; because the flowers have no spur.

SPECIES I.—ACERAS ANTHROPOPHORA. *R. Br.*

PLATE MCCCCXLVII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCLVII.
Billot, Fl. Gall. et Germ. Exsicc. No. 3240.
Ophrys anthropophora, *Linn.* *Sm.* Engl. Bot. ed. i. No. 29.

The only known species.

In chalk pits and on rough banks and the undisturbed borders of fields on chalky soil. Rather scarce. It occurs in the chalk districts of the south-eastern counties, but is not known to extend west of Sussex, Berks, Bucks, Northampton, and Lincoln. Reported to have been discovered by Mrs. Broaderick, in Hamphole Wood, near Doncaster.

England. Perennial. Early Summer.

Root 2 subglobular or ovoid knobs, in flowering plants varying from the size of a sloe to that of a small walnut. Stem 6 inches to 2 feet high, the spike at length occupying nearly half the stem, the lower half having a few sheathing bractlike leaves. Leaves sheathing, oblong, the outer ones broader and blunter than the inner, which are acute. Spike many-flowered, dense while in bud, at length rather lax and cylindrical, blunt. Bracts shorter than the ovary in flower. Flowers yellowish-green, frequently more or less tinged with maroon or dull brownish-red, especially on the labellum. Sepals and lateral petals similar, but the petals narrower, about $\frac{1}{4}$ inch long, concave, connivent into a helmet; labellum about $\frac{1}{2}$ inch long, hanging down, 3-lobed, the lateral lobes linear, the middle lobe strapshaped, longer than the lateral lobes, cleft one-third of the way up into 2 linear segments, the lateral lobes and segments of the labellum slender: these have been supposed to resemble the legs and arms of a man, whence the plant derives its specific name. Ovary twisted, green. Seeds, as in most of the tribe, extremely minute, with a loose reticulated covering.

Man Orchis.

French, *Ophrys homme pendu.* German, *Menschenähnliches Ohnhorn.*

The Orchis family is without question the most remarkable in the vegetable world. The anomalous structure of the flowers, their amazing variety, and the manner of life proper to the greater portion of the species are circumstances which give interest to a race of plants so peculiar. The few species which grow in Britain take root, like other plants, in the earth, but the tropical forms perch themselves upon the boughs and in clefts of trees, procuring their nourishment partly from the atmosphere, and partly from the decaying organic matter that casually accumulates about their roots. To denote this mode of existence, and to distinguish them from "parasites," the tree-inhabiting orchids are called "epiphytes." No plants unfold blossoms of more fantastic beauty, or of odours more delicious, or colours more vivid. They are utterly unlike other plants, and seem to take pleasure in the widest possible divergence from all accustomed types of structure, especially in the flowers, which remind us of insects, birds, reptiles, and even the human figure. Several of these vegetable mimics reside in our own country, but the species are distributed all over the globe; the largest number are, however, found in the tropics. In temperate countries—where they are exclusively terrestrial—they ornament groves, meadows, and marshes with flowers like little hyacinths. In the hot damp woods of the equatorial regions they are chiefly aërial, decorating the trees with the highest splendours of natural jewellery. Our great naturalist, Mr. Darwin, has written extensively on the nature and structure of orchids. He shows that most, if not all, of the British species require the aid of insects in order that the ovules may be fertilised—in other words, that an orchid is incapable of producing ripe seed by virtue merely of its own powers, and that the structure is actually opposed to it, and that were moths and other insects not to visit these plants when in bloom, they would be sterile. Moths he calls their "marriage priests." Deviations the most extraordinary from the customary condition and size of the parts appear to form no exception to the rule. If the flower be so constructed as to require some special adaptation on the part of an insect, the insect is forthcoming. The means by which the operation of fertilisation is performed has been minutely described by Mr. Darwin, and his work "On the Fertilisation of Orchids" is illustrated with numerous engravings, which greatly assist his readers to understand his theory. He says, "Let us suppose an insect to alight on the labellum, which forms a good landing-place, and to push its head into the chamber at the back of which lies the stigma, in order to reach with its proboscis the end of the nectary; or, which does equally well to show the action, push a sharply-pointed common pencil into the nectary. Owing to the pouch-formed rostellum projecting into the gangway of the nectary, it is scarcely possible that any object can be pushed into it without the rostellum being touched. The exterior membrane of the rostellum then ruptures in the proper lines, and the lip or pouch is most easily depressed. When this is effected, one or both of the viscid balls which lie at the base of the rostellum will almost infallibly touch the intruding body. So viscid are these balls that whatever they touch they firmly stick to. Moreover the viscid matter has the peculiar chemical quality of setting, like a cement, hard and dry in a few minutes' time. As the anther-cells are open in front, when the insect withdraws its head, or when the pencil is withdrawn, one pollen-bag or both will be withdrawn firmly cemented to the object projecting up like horns. The firmness of the attachment of the cement is very necessary, as we shall immediately see; for if the pollen-bags were to fall sideways or backwards they could never fertilise the flower. From the position in which the two pollinia lie in their cells, they diverge a little when attached to any object. Now, let us suppose our insect to fly to another flower, or insert the pencil with the attached pollen-bag into the same or into another nectary, it will be evident that the firmly-attached pollen-bag will be simply pushed against or into its old position—namely, into its anther-cell. How then can the flower be fertilised? This is effected by a beautiful contrivance: though the viscid substance remains immovably fixed, the apparently insignificant and minute disc of membrane to which the caudicule adheres is endowed with a remarkable power of contraction, which causes the pollen-bag to sweep through about 90 degrees always in one direction, viz. towards the apex of the proboscis or pencil in the course on an average of thirty seconds. Now after this movement and the interval of time which would allow the insect to fly to another flower, it will be seen that if the pencil be inserted into the nectary, the thick end of the pollen-bag will exactly strike the stigmatic surface. Here again comes into play another pretty adaptation, long ago noticed by Robert Brown. The stigma is very viscid, but not so viscid as when touched to pull the whole pollen-bag off the insect's head or off the pencil, yet sufficiently viscid to break the elastic threads by which the packets of pollen-grains are tied together and leave some of them on the stigma. Hence a pollen-bag attached to an insect or to the pencil can be applied to many stigmas and will fertilise all. I have seen the pollen-bag of *Orchis pyramidalis* adhering to the proboscis of a moth, with the stump-like caudicle alone left, all the packets of pollen having been left glued to the stigmas of the flowers successively visited. One or two little points must still be noticed. The balls of viscid matter within the pouch-formed rostellum are surrounded with fluid; and this is very important, for, as already mentioned, the viscid matter sets hard when exposed to the air for a very short time. I have pulled the balls out of their pouches, and have found that in a few minutes they entirely lost their power of adhesion. Again, the little discs of membrane, the movement of which as causing the movement of the pollen-bags is so absolutely indispensable for the fertilisation of the flower, lie at the upper and back surface of the rostellum, and are closely enfolded and thus kept damp within the bases of the anther-cells; and this is very necessary, as an exposure of about thirty seconds causes the movement of depression to take place; but as long as the disc is kept damp the pollen-bags remain ready for action whenever removed by an insect. Lastly, as I have shown, the pouch after having been depressed springs up to its former position, and this is of great service; for, if this action did not take place, and an insect after depressing the lip failed to remove either viscid ball, or if it removed one alone, in the first case both, and in the second case one of the viscid balls would be left exposed to the air. Consequently they would quickly lose all adhesiveness, and the pollen would be rendered absolutely useless. That insects often remove one alone of the two pollen-bags or pollinia at a time in many kinds of orchis is certain; it is even probable that they generally remove only one at a time, for the lower and older flowers almost always have both pollen-bags removed, and the younger flowers close beneath the buds, which will have been seldomer visited, have frequently only one pollinium removed. In a spike of *Orchis maculata* I found as many as ten flowers, chiefly the upper ones, which had only one pollinium removed; the other pollinium being in place, with the lip of the rostellum well closed up, and all the mechanism perfect for its subsequent removal by some insect." The nectary of *Aceras anthropophora*, our present species, is very short.

The British species of Orchis are mostly red or lilac in colour, sometimes white or green, and often beautifully mottled. With the exception of the green ones, all seem capable of the albino condition, and there are few that do not exhale perfume, especially in the evening; many kinds are, however, very capricious in this respect. They grow in woods, meadows, and pastures, in marshes, upon hills, and on grassy banks exposed to the splash of the sea; the insectiform species, however, are almost entirely confined to chalk and limestone. For the microscope they furnish, in all their parts, very beautiful objects. The green flowers of the species mentioned above present the figure of a little man "swinging as if some great ogre held him by the hair of his head."

GENUS II.—**ORCHIS.** *Linn.*

Sepals and lateral petals connivent, or the lateral sepals spreading or turned upwards; labellum turned downwards, spurred at the base. Anther wholly adnate to the columna; its 2 cells converging at the base, and each containing a stalked pollen-mass; caudicules affixed each to a separate gland, the 2 glands included within a common pouch, or rarely the two masses attached to 1 common gland. Stigma with a rostellate process extending between the bases of the anther-cells.

Terrestrial herbs, with the root-tubers globular, ovoid, or palmated. Leaves sheathing at the base, those on the stem smaller. Flowers in spikes pointing in all directions.

SUB-GENUS I.—HIMANTOGLOSSUM. *Spreng.*

Labellum with the middle lobe twisted, coiled in æstivation; spur very short. Pollen-masses attached to a common gland contained in a pouch.

SPECIES I.—**ORCHIS HIRCINA.** *Scop.*

PLATE MCCCCXLVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCLX.
Billot, Fl. Gall. et Germ. Exsicc. No. 2745.
Himantoglossum hircinum, *Spreng.* *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 795. *Parlat.* Fl. Ital. Vol. III. p. 443.
Aceras hircina, *Lindl.* Orchid. p. 282. *Reich. fil.* l.c. p. 5. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 283.
Loroglossum hircinum, *Rich.* in Ann. Mus. Vol. IV. p. 54. *Crep.* Man. Fl. Belg. ed. ii. p. 291.
Satyrium hircinum, *Linn.* *Sm.* Engl. Bot. ed. i. p. 34.

Rootknobs undivided, ovoid, or subglobular. Leaves oval-oblong, subobtuse. Flowers on a rather lax spike. Bracts longer than the ovary, scarious, 3- to 5-ribbed. Sepals and lateral petals connivent, pale greenish-olive, indistinctly streaked and spotted with dull purple; labellum 3-lobed, undulated at the base; the lateral lobes short, strap-shaped, acute; the middle lobe very long, much longer than the ovary, spirally coiled in bud, at length undulated and slightly spiral, strap-shaped, truncate and 2- or 3-toothed at the apex, greenish-white, spotted with purple towards the base, pale greenish-olive towards the apex; spur shorter than the sepals and much shorter than the germen, conical, very obtuse, slightly decurved.

Among bushes and in meadows in chalky soil. Very rare, and nearly extinct, though it still occasionally occurs about Darenth Wood near Dartford, Kent, where it has been recently found by Mr. Wollaston of Eltham; on the Downs, near Canterbury, Mr. George Oxenden saw it in 1859, but I believe it has now nearly or entirely disappeared from that station. In June 1847, the Rev. E. M. Blomfield found a single specimen in the village of Great Glemham, near Saxmundham, Suffolk.

England. Perennial. Summer.

Rootknobs from the size of a filbert to that of a walnut. Stem 15 inches to 3 feet high. Radical leaves 3 to 6 inches long, bearing considerable resemblance to those of Habenaria chlorantha; upper leaves narrower, sheathing the stem. Flowers numerous, in a rather lax spike, each flower with a bract at the base longer than the ovary. Upper perianth segments about $\frac{3}{10}$ inch long; labellum, measuring to the end of the middle lobe, $1\frac{1}{2}$ inch or more, the lateral lobes not above $\frac{1}{4}$ inch; spur about $\frac{1}{6}$ inch long.

I am indebted to Mr. G. Worthington Smith for a fresh specimen of this plant, obtained by Mr. Wollaston in the neighbourhood of Dartford.

Lizard Orchis.

French, *Orchis barbe de bouc.* German, *Bocks Riemenzunge.*

SUB-GENUS II.—ANACAMPTIS.

Labellum with the middle lobe not undulated, erect and not coiled in æstivation; spur very long. Pollen-masses attached to a common gland contained in a pouch.

SPECIES II.—**ORCHIS PYRAMIDALIS.** *Linn.*

PLATE MCCCCXLIX.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCLXI.
Billot, Fl. Gall. et Germ. No. 3242.
Anacamptis pyramidalis, *Rich.* *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 793. *Fries*, Summ. Veg. Scand. p. 61. *Hartm.* Skand. Fl. ed. ix. p. 190. *Parlat.* Fl. Ital. Vol. III. p. 451. *Crep.* Man. Fl. Belg. ed. ii. p. 291. *Lindl.* Syn. Brit. Fl. p. 261.
Aceras pyramidalis, *Reich. fil.* l. c. p. 6. *Gren.* & *Godr.* Fl. de Fr. Vol. III. p. 283.

Rootknobs undivided, subglobular or ovate-subglobular. Leaves oblong-strapshaped, acute. Flowers in a dense spike, at first pyramidal, afterwards ovoid. Bracts about as long as the ovary of the expanded flowers, scarious, coloured, 1- to 3-ribbed. Lateral sepals spreading, the sepals and lateral petals at first deep purplish-rose colour, afterwards rose; labellum bituberculate at the base, deeply 3-lobed, the lobes nearly equal, oblong, entire or crenulated at the apex, paler rose than the rest of the flower; spur filiform, acute, nearly as long as the ovary.

On downs, banks, and borders of fields on chalky and limestone soils; more rarely in loose sand. Very common in all the chalk and limestone districts in England. Very rare in Scotland, where it has occurred in loose sand near the Mull of Galloway, and at Largo in Fifeshire, and also in the Isle of Colonsay. Local and rather rare in Ireland, but occurring in ten out of the twelve districts into which the authors of the "Cybele Hibernica" have divided the island.

England, Scotland, Ireland. Perennial. Summer.

Rootknobs from the size of a large black currant to that of a damson plum. Stem slender, 8 inches to 2 feet 6 inches high. Leaves mostly radical, 3 to 6 inches long, resembling those of Gymnadenia conopsea. Flowering-spike 1 to 2 inches long. Sepals and lateral petals about $\frac{1}{4}$ inch long; labellum slightly exceeding them. Spur about $\frac{1}{4}$ inch long, very slender.

Pyramidal Orchis.

French, *Orchis pyramidal.* German, *Pyramidenförmige Hundswurz.*

SUB-GENUS III.—EU-ORCHIS.

Labellum with the middle lobe not undulated, erect and not coiled in æstivation; spur short or long. Pollen-masses each attached to a separate gland; the two glands contained in a common pouch.

SECTION I.—HERORCHIS. *Reich. fil.*

Sepals and lateral petals connivent, forming a helmet.

SPECIES III.—**ORCHIS USTULATA.** *Linn.*

PLATE MCCCCL.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCLXVIII.
Billot, Fl. Gall. et Germ. Exsicc. No. 855.

Rootknobs undivided, ovate- or oblong-ovoid. Leaves oblong-elliptical, acute. Flowers in a dense oblong spike. Bracts from half as long as the ovary to as long, scarious, 1-nerved. Sepals and lateral petals connivent into a roundish-ovate helmet; helmet free to the base; the sepals maroon-purple, ultimately white, subobtuse; labellum 3-lobed, white dotted with red, the lateral lobes oblong-strapshaped, entire or notched at the apex, the middle lobe about half as long again as the lateral lobes, more or less deeply cleft into 2 oblong or strapshaped segments about as long as and scarcely broader than the lateral lobes, generally crenulated at the apex, commonly with a short tooth in the sinus between them; spur cylindrical, decurved, obtuse, about one-fourth the length of the ovary.

On downs and pastures on chalky and limestone soils. Local, but widely distributed, extending from Devon, Isle of Wight, Sussex, and Kent, north to York, Durham, and Lancaster.

England. Perennial. Early Summer.

Rootknobs from the size of a horse-bean to that of a small walnut. Stem stout, 3 inches to 1 foot high. Leaves 1 to 5 inches long. Spike at first conical and very dense, afterwards blunt and slightly lax towards the base, ¾ to 2 inches long. Helmet about ⅕ inch long; labellum about ¼ inch long.

The helmet, composed of the 3 sepals and 2 lateral petals, is at first very dark maroon-purple, but becomes paler as the flowers expand, and before they wither assumes a white colour, and consequently, before all the flowers are open, the spike is dark-coloured above and nearly white below, which has been compared to the burnt end of a stick, whence the plant derives its name.

Dwarf Dark-winged Orchis.

French, *Orchis brûlé.* German, *Kleinblüthiges Knabenkraut.*

SPECIES IV.—ORCHIS PURPUREA. *Huds.*

PLATE MCCCCLI.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCLXXXVIII.
O. fusca, *Jacq.* *Sm.* Engl. Fl. Vol. IV. p. 13. *Hook. & Arn.* Brit. Fl. ed. viii. p. 433.
O. militaris, var. β, *Linn.* Spec. Pl. p. 1334. *Sm.* Engl. Bot. ed. i. No. 16. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 788. *Lindl.* Syn. Brit. Fl. p. 260.

Rootknobs undivided, ovate- or oblong-ovoid. Leaves oval-oblong. Flowers in a dense obtuse spike. Bracts about one-fourth as long as the ovary, 1-nerved. Sepals and lateral petals connivent into an ovate helmet; the sepals subacute and hooded, at first dark chocolate-purple, ultimately paler purple, and striped with dark maroon-purple; labellum whitish, shaded with rosy lilac or purplish-lilac, dotted with maroon-purple, 3-lobed, the lateral lobes strapshaped, entire or notched, the middle lobe scarcely half as long again as the lateral lobes, divided into

2 oblong or oblong-obovate segments, shorter than and four or five times as broad as the lateral lobes, crenulated at the apex, and usually with a small tooth in the sinus between them; spur cylindrical, decurved, blunt, about half as long as the ovary.

In copses and open woods. Rarely on open downs on chalky soil. Very local, and apparently confined to the county of Kent. Most plentiful in the neighbourhood of Cobham, and between Chatham and Sittingbourne. In 1864 I found a single specimen on the downs between Folkestone and Hythe. It has been reported from Sussex and Lincoln, but these counties require confirmation.

England. Perennial. Early Summer.

Rootknobs from the size of a damson plum to that of a pigeon's egg. Stem very stout, 1 to 3 feet high.

Leaves 3 to 6 inches long by 1½ to 2 inches broad, chiefly radical. Spike 2 to 6 inches. Helmet nearly ½ inch long; labellum ¾ inch, the ground colour varying from nearly white to rosy lilac, thickly spotted with raised dark purple dots.

The upper part of the spike is nearly black, from the very dark colour of the unexpanded sepals, and even when fully grown these never become white, as in O. ustulata, though the purple becomes paler, and marked with dark lines.

Great Dark-winged Orchis.

German, *Purpurrothes Knabenkraut.*

SPECIES V.—**ORCHIS MILITARIS.** "*Linn.*" *Jacq.*

PLATE MCCCCLII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCLXXVI.
Billot, Fl. Gall. et Germ. Exsicc. No. 3476.
O. Rivini, *Gouan.* *Reich. fil.* l. c. p. 30. *Crep.* Man. Fl. Belg. ed. ii. p. 292.
O. galeata. *Lam.* *D.C.* Fl. Fr. Vol. III. p. 249.

Rootknobs undivided, ovate-ovoid or subglobular. Leaves elliptical-oblong. Flowers in a dense obtuse spike. Bracts about one-fourth the length of the ovary, 1-nerved. Sepals and lateral petals connivent into a lanceolate helmet; the sepals acuminate, acute, white-veined, and sometimes dotted with purple; labellum whitish, shaded with pale purple and dotted with dark purple, 3-lobed, the lateral lobes strapshaped, entire, the middle lobe half as long again as the lateral lobes, divided into 2 oblong-strapshaped segments, shorter than and three or four times as broad as the lateral lobes, and rounded or truncate at the apex, with a conspicuous tooth in the sinus between them; spur cylindrical, decurved, blunt, about half as long as the ovary.

On banks, borders of fields, and the edges of woods, on chalky soil. Very local, apparently confined to the counties of Berks, Oxford, and Bucks. I have gathered it near Pangbourne in Berks, and in several places between Goring and Whitchurch, Oxford.

England. Perennial. Early Summer.

Rootknobs from the size of a black currant to that of a damson plum. Leaves 1½ to 4 inches long, usually narrower in proportion to their length than those of O. fusca. Stem 9 to 18 inches high. Spike 1½ to 3 inches long. Helmet about ½ inch long, much more acuminate than in O. fusca, and never tinged with dark purple as in that plant; labellum with the segments of the terminal lobe much narrower and less crenulated than in O. fusca, generally rounded and quite entire at the apex.

Mr. Bentham considers this not distinct from O. purpurea. I can only conclude he cannot have seen living specimens of both these species.

The name O. militaris is now in general use, so it is not expedient to adopt that of Gouan (O. Rivini), though the O. militaris of Linnæus included several species, and so has no claim to be retained on the ground of priority.

Military Orchis.

French, *Orchis militaire.* German, *Rivin's Knabenkraut.*

SPECIES VI.—ORCHIS SIMIA. *Lam.*

PLATE MCCCCLIII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCLXXIII.
Billot, Fl. Gall. et Germ. Exsicc. No. 1331.
O. tephrosanthos, *Vill.* *Sm.* Engl. Fl. Vol. IV. p. 16. *Hook. & Arn.* Brit. Fl. ed. viii. p. 434. *Lindl.* Syn. Brit. Fl. p. 260. *Parlat.* Fl. Ital. Vol. III. p. 482.
O. militaris, var. ε, *Linn.* *Sm.* Engl. Bot. ed. i. No. 1873.

Rootknobs undivided, ovate-ovoid or subglobular. Leaves oblong. Flowers in a dense very obtuse spike. Bracts about one-fourth the length of the ovary, scarious, 1-nerved. Sepals and lateral petals connivent into a lanceolate helmet, the sepals acuminate, acute, white, and sometimes veined or dotted with pale rose; labellum white, with crimson lobes and segments, the lateral lobes linear-strapshaped, entire, the middle lobe half as long again as the lateral lobes, divided into 2 linear-strapshaped segments as long as and of the same breadth as the lateral lobes, rounded or truncate, with a conspicuous tooth in the sinus between them; spur cylindrical, decurved, blunt, about half as long as the ovary.

In the borders of fields and edges of woods in chalky places. Very local. Apparently confined to the county of Oxford, where I have found it in various places between Goring and Caversham. It appears formerly to have been found in Berks along with O. militaris; but after searching most carefully for three seasons, I have been unable to find it on the south side of the Thames, so I fear it has become extinct there. It has been reported from near Dartford, Kent, but not on sufficient authority.

England. Perennial. Early Summer.

Very similar to O. militaris, but I believe distinct from it. It has a blunter spike, the helmet is paler or spotted with rose instead of pale ashy purple, and the labellum has the lateral lobes similar in length and breadth to the segments of the terminal lobe, and crimson. In O. militaris the segments of the terminal lobe are considerably shorter and broader than the lateral lobes, and the neck of the middle lobe, before it divides into two, is considerably broader in proportion.

Towards Goring, O. Simia and O. militaris grow together; and there intermediate forms connecting the two occur, which I believe to be of hybrid origin. I have seen none of these intermediate forms near Pangbourne, where O. militaris alone grows; nor between Mapledurham and Caversham, where O. Simia occurs without O. militaris.

Monkey Orchis.

SPECIES VII.—**ORCHIS MORIO.** *Linn.*

PLATE MCCCCLIV.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCLXIII.
Billot, Fl. Gall. et Germ. Exsicc. No. 172.

Rootknobs undivided, globular or subglobular. Leaves elliptical-strapshaped, not spotted. Flowers in a rather lax blunt spike. Bracts nearly as long as the ovary, scarious, coloured, 1-nerved. Sepals and lateral petals combined into an ascending subglobular compressed helmet, the sepals blunt, purple veined with green; labellum broader than long, with the sides more or less reflexed, purple, paler at the base, and spotted with darker purple, 3-lobed, the lateral lobes subquadrate, wedgeshaped, crenulated, the middle lobe scarcely longer than the lateral lobes, and about the same width, notched and more or less crenulate; spur cylindrical, nearly straight, truncate, ascending or horizontal, nearly as long as the ovary.

In meadows and pastures. Common in the south of England, but becoming scarcer towards the north, and not extending to Scotland. Rather rare in Ireland, and chiefly found towards the east and middle.

England, Ireland. Perennial. Late Spring, early Summer

Rootknobs the size of a black currant to that of a cherry. Stem 4 to 15 inches high. Leaves 1½ to 3 inches long, rather narrow and recurved. Spike 1 to 3 inches long; the flowers more distant than in any of the preceding. Helmet about ⅜ inch long, and the spur about ½ inch. Flowers dark crimson-purple, with the sepals more or less distinctly marked with greenish lines; rarely the flowers are flesh-coloured or white.

Green-winged Meadow Orchis.

French, *Orchis Bouffon.* German, *Gemeines Knabenkraut.*

SECTION II.—ANDRORCHIS. *Reich. fil.*

Lateral sepals more or less spreading or reflexed, not connivent in a helmet.

SPECIES VIII.—**ORCHIS MASCULA.** *Linn.*

PLATE MCCCCLV.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCXC.
Billot, Fl. Gall. et Germ. Exsicc. No. 2246.

Rootknobs undivided, ovate- or oval-subglobular. Leaves oblong-oblanceolate or strapshaped-oblanceolate, obtuse or subobtuse, generally spotted with purplish-black. Flowers in a rather lax blunt spike. Bracts about as long as the ovary, scarious, coloured, 1-nerved. Lateral sepals at first spreading, at length reflexed, the upper sepal and the petals connivent, all of them acute or obtuse or acuminate, purplish-crimson; labellum about as broad as long, with the sides more or less reflexed, crimson-purple, paler at the base and spotted with darker purple, 3-lobed; the middle lobe a little longer than the lateral lobes, and about equal to them in length, emarginate or notched, and more or less crenulate; spur broadly cylindrical, nearly straight or incurved, truncate or obtuse, ascending or horizontal, about as long as the ovary.

In pastures and open places in woods and by their borders. Common, and universally distributed.

England, Scotland, Ireland. Perennial. Late Spring, early Summer.

Rootknobs from the size of a hazel nut to that of a small walnut. Leaves 3 to 9 inches long, sometimes wholly green, but more commony with round spots of very dark purple, almost black. Stem 8 inches to 2 feet high. Spike 2 to 6 inches long. Sepals nearly ½ inch long, generally acute, but sometimes obtuse, and sometimes acuminate when it is the O. speciosa, *Host.* (*Reich.* l. c. tab. cccxci. figs. 1 and 2); but it seems impossible to draw any line of demarcation between the three forms. Flowers redder and less purple than in O. Morio, and the sepals without green lines.

Early Purple Orchis.

French, *Orchis mâle.* German, *Männliches Knabenkraut.*

This is perhaps the best known of all the British Orchids. Its tuberous roots abound in a starch-like matter, called by chemists *bassorin*, which is likewise found in the roots of *Orchis Morio.* This substance, which is a kind of starch, is contained in the tubers of various species of Orchis, which are prepared in Turkey and Persia, and exported as an article of food under the name of "saloop" or "salep." At one time salep was a favourite beverage in England, as procured from the native species of Orchis, but it has fallen into disuse. The mode of preparation is to dig up the new roots at the end of summer, when the seed is fully formed, the bulbs being then in perfection; they are then scalded in water and dried in an oven till they acquire a horny consistence, the outer skin being first rubbed off. When used as food, this horny substance is simply boiled in water to the required consistency. Salep appears to form a very healthful article of diet, and has been frequently recommended in delicate conditions of health. It is said that a small quantity of salep added to milk has been found to retard the commencement of acetous fermentation in that fluid; and that a moderate proportion of it added to wheaten flour is a useful and economical addition in making bread. A very small quantity of salep is sufficient to support life, an ounce a day having been known to sustain a man for nearly a week.

The "long purples" mentioned by Shakspeare are, we imagine, a variety of Orchis, still called "dead men's fingers" in some parts of the country.

> "Therewith fantastic garlands did she make
> Of crow-flowers, nettles, daisies, and *long purples*,
> That liberal shepherds give a grosser name,
> But our cold maids do dead men's fingers call them:
> There, on the pendent boughs her coronet weeds
> Clambering to hang, an envious sliver broke;
> When down her weedy trophies, and herself,
> Fell in the weeping brook."

SPECIES IX.—ORCHIS LAXIFLORA. *Lam.*

PLATE MCCCCLVI.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCXCIII. Fig. 1.

Rootknobs globular, undivided or subglobular. Leaves strapshaped or lanceolate-strapshaped, acuminate and very acute, not spotted. Flowers in a very lax spike. Bracts about as long as the ovary, subherbaceous, generally tinged with crimson, 3- to 5-nerved. Lateral sepals spreading-ascending, at length reflexed, the upper sepal and the petals connivent, all of them obtuse, crimson-purple; labellum about as broad as long, with the sides reflexed, crimson-purple, paler at the base, and spotted with darker purple, 3-lobed; the middle lobe (in the Channel Islands plant) shorter than the lateral lobes, truncate or emarginate and more or less crenulate; spur cylindrical, nearly straight or slightly incurved, truncate or obtuse, horizontal or ascending, about half as long as the ovary.

In meadows and marshy places. Frequent in the Channel Islands, especially about Cobo in Guernsey, and St. Ouen's Pond, Jersey.

Channel Islands. Perennial. Early Summer.

Rootknobs from the size of a black currant to that of a damson plum. Leaves 3 to 6 inches long, not aggregated in a radical rosette as in all the preceding species, but distributed over the stem, which is 1 to 3 feet high. Spike 3 to 9 inches long, resembling that of O. Morio, but more lax. The flowers are of a very rich crimson-purple, like that of O. Morio. Sepals about ½ inch long; the labellum rather longer, and with the central lobe truncate or deficient in the Jersey plant, which is the true O. laxiflora, as distinguished from O. palustris (*Jacq.*): the latter has the central lobe of the labellum as long as, or longer than, the two lateral lobes, the leaves narrower, and the bracts longer; but the two forms are only subspecies—if not mere varieties.

Lax-flowered Orchis.

French, *Orchis à fleurs lâches.* German, *Lockerblüthiges Knabenkraut.*

SPECIES X.—ORCHIS PALMATA.

PLATES MCCCCLVII. MCCCCLVIII.

Orchis latifolia, *Benth.* Handbk. Brit. Fl. ed. ii. p. 459. *Hook. & Arn.* Brit. Fl. ed. viii. p. 434.

Rootknobs palmately cleft, compressed. Stem hollow. Leaves lanceolate or oblong-elliptical, acute or subacute, spotted with purplish-black or immaculate. Flowers in a dense oblong-cylindrical slightly tapering blunt spike. Bracts herbaceous, 3-nerved, the lower ones or all of them equalling or exceeding the flowers. Lateral sepals reflexed upwards, the upper one and the petals connivent, all of them acute or obtuse, dull purplish-crimson or lilac or purplish-rose, with purple ribs; labellum about as broad as long, with the sides reflexed, dull purplish-crimson or lilac or purplish-rose, paler at the base, and spotted or lined with purple, obscurely 3-lobed or subentire; the middle lobe narrower than the lateral lobes and equalling or exceeding them, the lateral lobes entire or erose; spur cylindrical or conico-cylindrical, nearly straight or slightly decurved, shorter than the ovary or about equal to it.

SUB-SPECIES I.—**Orchis incarnata.** "*Linn.*" *Fries.*

PLATE MCCCCLVII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCXCIV. to CCCC.
O. latifolia, *Sm.* Engl. Bot. ed. i. No. 2308.

Leaves lanceolate, broadest near the base, acute, slightly hooded at the apex, unspotted, blunt. Bracts exceeding the lower flowers, and often all the flowers. Sepals pale lilac or pale purplish-rose; labellum lilac or pale purplish-rose, paler at the base and spotted and lined with dark purple; the middle lobe generally a little longer than the lateral lobes; spur cylindrical. Seeds with the cells of the testa hyaline (*Reich. fil.*).

In wet meadows, in open places in wet woods. Apparently common, and generally distributed in the south of England. I have gathered it plentifully near Godalming, and have specimens from Dorset, Kent, and South Wales. Professor Babington gives several stations in Cambridgeshire; and the Rev. W. A. Leighton found it in Shropshire; but I have at present no records that can be trusted of its occurrence further north, though it is most likely that it is more widely distributed.

England, "Ireland" (*Bab.*). Perennial. Summer.

Rootknobs about the size of an almond out of its shell to that of the almond shell itself. Stem 9 inches to 3 feet high. Leaves generally distributed pretty equally over the whole length of the stem; the lower ones 3 to 8 inches long; the upper ones much smaller and commonly nearly erect. Spike $2\frac{1}{2}$ to 9 inches long, tapering slightly upwards. Flowers usually very pale purple with darker lines; the upper sepals about $\frac{3}{16}$ inch long; labellum about $\frac{3}{8}$ inch, marked with spots and lines of darker purple. The younger Reichenbach describes the testa of the seeds (which I have not seen) as differing from that of O. latifolia.

Sometimes the leaves are very narrow, and the spike few-flowered, with shorter bracts, when it is the O. Traunsterneri of Koch, and the O. angustifolia of the elder Reichenbach.

Common Marsh Orchis.

French, *Orchis incarnat.* German, *Fleischfarbiges Knabenkraut.*

SUB-SPECIES II.—**Orchis latifolia.** "*Linn.*" *Fries.*

PLATE MCCCCLVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCC. Fig. 2 to 4.
Billot, Fl. Gall. et Germ. Exsicc. No. 657.
O. maialis, *Reich.* Pl. Crit. Vol. VI. p. 7.

Leaves oblong-elliptical, broadest near the middle, subacute or acute, not hooded at the apex, usually spotted with purplish-black. Bracts equalling or exceeding the lower flowers and sometimes all the flowers, but generally shorter than the upper ones. Sepals dull purplish-crimson; labellum dull purplish-crimson, paler at the base, and spotted and lined with dark purple; the middle lobe usually not longer than the lateral lobes; spur conical. Seeds with the cells of the testa reticulate.

In bogs and marshes, especially in peaty soil. Rather common, and generally distributed.

England, Scotland, Ireland. Perennial. Early Summer.

O. latifolia comes very near O. incarnata, from which it differs in the lower leaves being usually more spreading, and often spotted with dark purple, and especially in their base being narrowed and their apex not hooded. The flowers are rather smaller, darker, and redder.

A form of this, 3 feet high, is cultivated under the name O. maculata-superba.

Broad-leaved Marsh Orchis.

French, *Orchis à larges feuilles.* German, *Breitblättriges Knabenkraut.*

SPECIES XI.—**ORCHIS MACULATA.** *Linn.*

PLATE MCCCCLIX.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCVI. to CCCCIX.
Billot, Fl. Gall. et Germ. Exsicc. No. 2379.

Rootknobs palmately cleft, compressed. Stem solid during the period of flowering. Lower leaves oval or oblong, subobtuse, almost always spotted with purplish-black; upper ones lanceolate or strap-shaped, acute. Flowers in a dense oblong-pyramidal spike, which is subacute until all the flowers are expanded. Bracts herbaceous, 3-nerved, all usually shorter than the flowers, or at least not exceeding them. Lateral sepals reflexed upwards, the upper one and the petals connivent, all of them subobtuse or acute, pale lilac or white, with purple ribs; labellum about as broad as long, with the sides reflexed, pale lilac or nearly white, spotted or lined with purple, deeply 3-lobed; the middle lobe narrower than the lateral ones and slightly exceeding them, or more rarely only equal to them in length; the lateral lobes commonly denticulate; spur conico-cylindrical, straight, shorter than the ovary or about equal to it.

In meadows, pastures, damp places in open woods and on chalky banks. Common and generally distributed.

England, Scotland, Ireland. Perennial. Summer.

Rootknobs similar to those of the preceding species. Stem 6 inches to 2 feet high or even more, more slender and commonly with a greater difference in the size and shape of the upper and lower leaves, the lower leaves of O. maculata being more spreading, larger, broader, and blunter than the upper ones, and almost always thickly spotted with circular blotches of purplish-black. Spike 1 to 3 inches long, more attenuated towards the apex and more acute, the bracts shorter in proportion, the flowers usually paler, the labellum much more deeply 3-lobed, and the lateral lobes usually much more crenate-denticulate; the time of flowering is later than that of O. latifolia and about the same time as that of O. incarnata.

Spotted Palmate Orchis.

French, *Orchis taché.* German, *Gefleckter Knabenkraut.*

GENUS III.—GYMNADENIA. *R. Brown.*

Perianth segments spreading, or the upper 5 segments connivent; labellum turned downwards, spurred at the base. Anther wholly adnate to the column; its 2 cells converging at the base, and each containing a pollen-mass, of which the caudicule is affixed to a gland, the two glands not included in a pouch. Stigma with a rostellate process extending between the bases of the anther-cells.

Herbs with palmated or pointed (rarely subglobular) rootknobs. Habit similar to that of Orchis, but sometimes the flowers are more or less secund.

The derivation of the name of this genus of plants is from the Greek words, *γυμνός*, naked, and *ἀδήν*, a gland, because the glands are not contained in a pouch.

SPECIES I.—GYMNADENIA CONOPSEA. *R. Br.*

PLATE MCCCCLX.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCXXII. to CCCCXXV.
Billot, Fl. Gall. et Germ. Exsicc. No. 2378.
Reich. fil. l.c. p. 113.
Orchis conopsea, *Linn.* *Sm.* Engl. Bot. ed. i. No. 10. *Benth.* Handbk. Brit. Bot. ed. ii. p. 460. *Sm.* Eng. Fl. Vol. IV. p. 23.

Rootknobs 2, palmately cleft, compressed. Leaves oblong-strap-shaped or strapshaped-lanceolate, acute. Flowers in a dense or rather dense cylindrical tapering spike, not unilateral. Lateral sepals spreading, the upper one and the lateral petals connivent; labellum about as broad as long, 3-lobed; the lobes all oblong-deltoid, obtuse, or the lateral lobes subrhombic; the middle lobe as broad as and a little longer than the lateral lobes; the whole of the perianth segments pale purple; spur very slender, slightly decurved, filiform-subulate, acute, very long, usually about twice as long as the ovary. Rostellate process elongate.

In bogs and on heaths and chalky banks and borders of fields. Rather common and generally distributed.

England, Scotland, Ireland. Perennial. Late Summer.

Rootknobs 2, very similar to those of Orchis maculata. Stem 6 inches to 2 feet high. Leaves 2 to 6 inches long or more, folded down the middle and keeled on the back, more or less recurved, the lower ones much larger than those on the upper part of the stem. Spike 1 to 4 inches long. Bracts herbaceous, about as long as the flowers or more rarely exceeding them, 3-nerved. Flowers similar in size and shape to those of Orchis pyramidalis, but paler and much more purple in their hue; spur considerably longer than in that plant, from which G. conopsea (which probably ought to be referred to the genus Orchis) may also be known by its palmated root-tubers, laxer and less conical spike, and very fragrant flowers.

The Rev. W. W. Newbould informs me that he has gathered, on Barkway Moor, Herts, the large short-spurred form called Orchis densiflora by Wahlenberg.

Fragrant Orchis.

French, *Orchis suave.* German, *Fliegenartige Höswurz.*

This is one of the most fragrant and delicious of our native Orchids, the odour resembling that of the carnation.

SPECIES II.—GYMNADENIA ALBIDA. *Rich.*

PLATE MCCCCLXI.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCXIX.
Reich. fil. l.c. 110.
Habenaria albida, *R. Br.* *Benth.* Handbk. Brit. Bot. ed. ii. p. 460. *Hook. & Arn.* Brit. Fl. ed. viii. p. 436.
Orchis albida, *Scop.* *Sm.* Engl. Fl. Vol. IV. p. 18. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 299.
Bocchia albida, *Parl.* Fl. Ital. Vol. III. p. 397.
Platanthera albida, *Lindl.* Syn. Brit. Fl. p. 261.
Peristylus albidus, *Lindl.* Orchid. p. 299.
Satyrium albidum, *Linn.* *Sm.* Engl. Bot. ed. i. p. 505.

Rootknobs several, narrowly conico-cylindrical. Lower leaves oblong or oblong-oblanceolate, obtuse; upper leaves lanceolate, acute. Flowers in a very dense subunilateral spike. Sepals and lateral petals connivent; labellum about as broad as long, 3-lobed; the lobes all oblong-triangular; the middle lobe as broad as and a little longer than the lateral lobes; the whole of the perianth segments greenish-white; spur thick, ovate, conical, obtuse, decurved, not half the length of the ovary.

In pastures in hilly districts. Rather local. With the exception of Sussex it appears to occur in England only in Wales and the northern counties; but in Scotland it is not uncommon, reaching to Orkney and Shetland. In Ireland it is widely though locally distributed, but most common in the north and west.

England, Scotland, Ireland. Perennial. Summer, early Autumn.

Root consisting of tapering fleshy fibres of unequal size. Stem 6 inches to 1 foot high. Leaves ascending or erect, rarely above 1 or 2 inches long, the lowest ones broader and blunter than the others. Spike $\frac{3}{4}$ to 3 inches long, with the flowers turned to one side. Ovaries curved so that the flower is horizontal or slightly drooping. Bracts subherbaceous, about as long as the ovary or longer. Perianth segments scarcely $\frac{1}{8}$ inch long, ovate, obtuse, the lip scarcely longer than the other segments, and subconnivent with the others. Anther-cells nearly parallel, and thus making an approach to those of the next genus, in which G. albida is placed by many authors; but I have included it in Gymnadenia on the authority of the younger Reichenbach, the greatest living authority on Orchidaceæ.

Small White Orchis.

French, *Orchis blanc.* German, *Weissliche Höswurz.*

GENUS IV.—**HABENARIA.** *Brown.*

Perianth spreading, or the five upper segments connivent; labellum turned downwards, spurred at the base. Anther wholly adnate to the column, its two cells separate and diverging at the base or subparallel, each containing a pollen-mass, of which the caudicule is affixed to a gland; the two glands not included in a pouch. Stigma without a rostellate process extending between the bases of the anther-cells.

Herbs with tapering rootknobs. Habit similar to that of Orchis.

The derivation of the name of this genus is given by Dr. Mayne and others as from the Latin *habena*, a rein or thong, which the elongate labellum of the commonest species is supposed to resemble.

SPECIES I.—HABENARIA VIRIDIS. *R. Br.*

PLATE MCCCCLXII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCXXXIV.
Billot, Fl. Gall. et Germ. Exsicc. No. 2936.
Platanthera viridis, *Lindl.* Syn. Brit. Fl. p. 261. *Reich. fil.* l. c. p. 129.
Gymnadenia viridis, *Rich.* *Coss.* & *Germ.* Fl. Par. ed. ii. p. 688. *Crep.* Man. Fl. Belg. ed. ii. p. 294.
Orchis viridis, *Crantz.* *Gren.* & *Godr.* Fl. de Fr. Vol. III. p. 298. *Sm.* Engl. Fl. Vol. IV. p. 20.
Cœloglossum viride, *Hartm.* Scand. Fl. ed. ix. p. 190. *Fries*, Summ. Veg. Scand. p. 61. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 795. *Parl.* Fl. Ital. Vol. III. p. 407.
Satyrium viride, *Linn.* *Sm.* Eng. Bot. ed. i. No. 94.

Root-tubers 2, ovate-ovoid, acuminate, commonly cleft. Lower leaves oblong or oblong-oblanceolate, obtuse or acute; upper leaves smaller, lanceolate, acute. Flowers in a rather lax oblong-cylindrical spike. Sepals and lateral petals connivent in a subglobular helmet; labellum pendant or reflexed, longer than broad, oblong-strapshaped, twice as long as the other segments, with 2 short lobes at the apex with a tooth between them; the whole of the perianth segments pale olive-green, more or less tinged with brown, especially on the labellum; spur short, ovoid-conical, blunt, often emarginate, 3 or 4 times shorter than the ovary.

In meadows and hilly pastures. Rather local, and generally distributed, but much more common in the north than in the south, extending to Orkney and Shetland.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Rootknobs seldom larger than a cherry stone. Stem 2 to 15 inches high, with commonly 3 to 5 leaves, the largest rarely more than 1 to 2 inches long. Spike ½ to 4 inches long. Bracts herbaceous, about as long as the flowers or exceeding them. Perianth segments about ⅙ inch long, ovate, subacute; petals linear and acute; labellum usually applied to the ovary, rather more than ¼ inch long, with the central tooth variable in size, sometimes nearly as large as the apical lobes, at other times scarcely perceptible.

Frog Orchis.

French, *Orchis vert.* German, *Grüne Kuckucksblume.*

SPECIES II.—HABENARIA BIFOLIA. *R. Br.*

PLATES MCCCCLXIII. MCCCCLXIV.

Orchis bifolia, *Linn.* *Sm.* Engl. Fl. Vol. IV. p. 9.
Platanthera bifolia, *Lind.* Syn. Brit. Fl. p. 261.

Root-tubers 2, ovate- or lanceolate-ovoid, acuminate, undivided.

Lower leaves 2 (rarely 3), oblanceolate or oblong-obovate, obtuse; upper leaves very small, strapshaped-lanceolate. Flowers in a rather lax oblong-cylindrical spike. Lateral sepals spreading-deflexed; upper sepal and petals connivent; labellum oblong-strapshaped, entire, rather longer than the other segments; the whole of the perianth segments white tinged with pale green; spur very long and slender, filiform or cylindrical, more or less clavate, much longer than the ovary, usually about twice as long.

SUB-SPECIES I.—**Habenaria eu-bifolia.***

PLATE MCCCCLXIV.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCXXIX.
Billot, Fl. Gall. et Germ. Exsicc. No. 2746.
H. bifolia, *Bab.* Man. Brit. Bot. ed. vi. p. 380; and Eng. Bot. Suppl. No. 2806. *Hook.* & *Arn.* Brit. Fl. ed. viii. p. 437.
Orchis bifolia, *Gren.* & *Godr.* Fl. de Fr. Vol. III. p. 297.
Platanthera bifolia, *Reich.* *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 795. *Hartm.* Scand. Fl. ed. ix. p. 191. *Fries*, Summ. Veg. Scand. p. 61. *Parl.* Fl. Ital. Vol. III. p. 411. *Crep.* Man. Fl. Belg. ed. ii. p. 294.
P. solstitialis, *Bönningh.* *Reich. fil.* l. c. p. 120.

Sepals strapshaped-lanceolate; spur cylindrical-filiform, slightly clavate, nearly horizontal. Anther-cells parallel; caudicules short, glands oval.

In meadows, pastures, heaths, and open woods. Common, and generally distributed, except in the extreme north of Scotland. Rather rare, but generally distributed in Ireland.

England, Scotland, Ireland. Perennial. Summer.

Rootknobs from the size of a cherry-stone to that of a shelled almond or a little larger, attenuated into a tail. Radical leaves 2 to 6 inches long, narrowed into a stalk at the base. Stem 6 to 18 inches high, with a few small leaves. Spike 1 to 8 inches long, sometimes rather dense, but generally lax. Bracts herbaceous, lanceolate, usually about as long as the ovary. Sepals $\frac{1}{4}$ to $\frac{3}{8}$ inch long, white, usually tinged with green; labellum narrower than the sepals, and $\frac{3}{8}$ to $\frac{1}{2}$ inch long.

Lesser Butterfly Orchis.

French, *Orchis à deux feuilles.* German, *Zweiblättrige Kuckucksblume.*

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* The names and numbers have been transposed on Plates MCCCCLXIII. and MCCCCLXIV.

SUB-SPECIES II.—**Habenaria chlorantha.** *Bab.*

PLATE MCCCCLXIII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCXXX.
Billot, Fl. Gall. et Germ. Exsicc. No. 2747.
Bab. Trans. Linn. Soc. Vol. XVII. p. 462. Man. Brit. Bot. ed. vi. p. 330. *Hook.* & *Arn.* Brit. Fl. ed. viii. p. 437.
Orchis bifolia, *Sm.* Engl. Bot. ed. i. No. 22.
O. montana, *Schmidt; Gren.* & *Godr.* Fl. de Fr. Vol. III. p. 297.
Platanthera chlorantha, *Reich.* *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 795. *Fries*, Summ. Veg. Scand. p. 61. *Parl.* Fl. Ital. Vol. III. p. 413. *Hartm.* Fl. Scand. ed. ix. p. 191.
P. montana, *Reich. fil.* l. c. p. 123. *Crep.* Man. Fl. Belg. ed. ii. p. 294.

Sepals lanceolate or ovate-lanceolate; spur cylindrical-clavate, compressed, decurved. Anther-cells twice as distant at the base as at the apex; caudicules elongate; glands circular.

On pastures, grassy banks, and open places in woods. Common, and generally distributed, except in the extreme north of Scotland. Frequent in Ireland.

England, Scotland, Ireland. Perennial. Early Summer.

Very similar to H. eu-bifolia, but larger in all its parts. The leaves 3 to 8 inches long; the stem 1 to 2 feet high; spike 3 to 8 inches: sepals about ½ inch long, purer white than in H. eu-bifolia, considerably broader; the spur thicker, more compressed, and more clavate; but the most important difference lies in the anther-cells diverging greatly towards the base, and the lateral sepals are less reflexed. The time of flowering is considerably earlier.

I have met with specimens on the Reigate hills about which it was difficult to decide whether to refer them to H. eu-bifolia or to H. chlorantha. I was not at that time aware of the difference in the size and shape of the glands, length of the caudicule, and shape of the stigmatic surface, pointed out by Mr. Darwin, or it would have been interesting to see if these were intermediate as well as the more obvious characters.

Greater Butterfly Orchis.

Mr. Darwin, in writing on the family of Orchids, says of this species, "I am aware that this form and the last are considered by some botanists as mere varieties of each other, but we shall see that the two forms differ in a great number of characters, not to mention the differences in general aspect and in the stations inhabited, with which we are not here concerned. Should these two forms be hereafter proved to graduate at the present day into each other, it would be a remarkable case of variation; and I for one should be as much pleased as surprised at the fact, for these two forms certainly differ from each other more than do most species of the genus Orchis." He goes on to say that, as soon as he had examined the Lesser Butterfly Orchis, he felt convinced from the position of the viscid discs that it would be fertilised in a different manner from the Larger Butterfly Orchis; and on examining the moths which frequent the species he verified his own suspicion, and tells us that the pollinia of the two species of Habenaria, when attached to moths, could be distinguished at a glance. He says, "A poet might imagine that whilst the pollinia are borne from flower to flower through the air, adhering to a moth's body, they voluntarily and eagerly place themselves in each case in that exact position in which alone they can hope to gain their wish and perpetuate their race."

GENUS V.—**NEOTINEA.** *Reich. fil.*

Perianth segments all connivent; labellum turned downwards, sharply spurred at the base. Anther wholly adnate to the column; its two cells subparallel, and each containing a pollen-mass of which the caudicule is affixed to a gland, the two glands naked, but appearing to be enclosed in a pouch from the "apex of the rostellum being rolled inwards." Stigma produced into a plate in front of the pollen-masses with 2 crescent-shaped elevations.

A small herb with roundish-ovoid root-tubers, and the habitat of the preceding genus.

The name of this genus was originally *Tinea*, to which the younger Reichenbach prefixed Neo, to distinguish it from *Tinea*, a well-known genus of small moths.

SPECIES I.—**NEOTINEA INTACTA.** *Reich. fil.*

PLATE MCCCCLXV.*

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. D.
Reich. fil. in *Seemann's* Journ. Bot. 1865, p. 1.
Orchis intacta, *Link.* *Benth.* Handbk. Brit. Bot. ed. ii. p. 458.
O. secundiflora, *Bert.* Fl. Ital. Vol. IX. p. 533.
Aceras intacta, *Reich. fil.* l. c. p. 2.
Aceras secundiflora, *Lindl.* in Bot. Reg. No. 1525.
A. densiflora, *Boiss.* *Gren. & Godr.* Fl. de Fr. Vol. III. p. 282.
Tinea (or Tinæa) cylindracea, *Biv.* *Parl.* Fl. Ital. Vol. III. p. 404.
Satyrium maculatum, *Desf.* Fl. Atlan. Vol. II. p. 319.

The only known species.

On calcareous rocky pastures, called the Hunting Course, west of the nut wood, Taylor, co. Galway, by Miss T. M. More; first found in May 1864.

Ireland. Perennial. Early Summer.

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* Our plate is copied from that given in Dr. Seemann's "Journal of Botany," from a drawing by Dr. H. Reichenbach, for permission to copy which the publisher is indebted to Dr. Seemann, it being found impossible to procure fresh specimens from which to draw a figure for this work.

Of this plant I have seen only dried continental specimens. The dried plant has much the aspect of Habenaria albida, but the rootknobs are 2, ovoid. The leaves are elliptical oblong, and chiefly collected into a rosette of 2 to 4, and are said to be generally spotted with brown. The stem in my specimens is 6 inches to 1 foot high, but Reichenbach says it is sometimes as little as 2 inches. Spike 1 to 3 inches long, dense. Flowers more or less turned in one direction. Bracts triangular-lanceolate, membranous, 1-nerved, shorter than the ovary. Sepals and lateral petals connivent, the former lanceolate-acute; labellum a little longer than the perianth segments, suberect, oblong, 3-lobed; the lateral lobes strapshaped; the central lobe extending one-half beyond the lateral lobes and twice as broad, and truncate or notched at the apex; spur very short, conical. The perianth is described as pale pink, with the sepals and base of the labellum sometimes blotched with pale purple. The plant is remarkable for the two fleshy semilunar lobes of the stigma, with a broad flat plate between them. The anther-cells are affixed each to a gland; these glands are really naked, but appear to be contained in a pouch, from the "apex of the whole of the rostellum being rolled inwards." (See "Proceedings of the London Botanical Congress, 1866," p. 176.)

Dense-Flowered Orchis.

GENUS VI.—**HERMINIUM.** *R. Brown.*

Perianth segments all connivent; labellum turned downwards, not spurred at the base. Anther wholly adnate to the column; its two cells diverging at the base, and each containing a pollen-mass of which the very short caudicule is affixed to a larger gland, the two glands not contained in a pouch. Stigma without a rostellate process extending between the anther-cells or a plate in front of them.

Herbs with globular rootknobs, the new one formed at the extremity of a stolon in the British species. The habit is that of the preceding genera.

This genus of Orchids is said to have been named after Hermione, the daughter of Helen.

SPECIES I.—**HERMINIUM MONORCHIS.** *R.Br.*

PLATE MCCCCLXVI.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCXV.
Billot, Fl. Gall. et Germ. Exsicc. No. 658.
Ophrys Monorchis, *Linn.* *Sm.* Engl. Bot. No. 71.
Herminium clandestinum, *Gren. & Godr.* Fl. de Fr. Vol. III. p. 299.

Rootknobs 2 or more, subglobose, the newly-formed one or ones much smaller than the other, and produced at the extremity of a long slender fleshy stolon. Radical leaves commonly 2, oblong or elliptical-oblong, acute; stem leaves none or 1, rarely 2, much smaller than the radical leaves. Flowers in a rather dense elongated spike. Bracts about as long as the ovary. Labellum saccate at the base, 3-cleft; the middle lobe nearly twice as long as the lateral lobes; all the perianth segments pale greenish-yellow.

In chalky and limestone pastures and on banks. Local; occurring in Hants, Sussex, Kent, Surrey, Essex (extinct ?), Berks, Bucks, Oxford, Suffolk, Norfolk, Cambridge, Gloucester. It has also been reported from Somerset, but this locality requires confirmation. I have collected this plant only at Headley Lane and Compton quarries, Surrey, but have specimens also from Cheltenham, Gloucester; and Halstead, Kent.

England. Perennial. Summer.

Rootknob at the base of the stem from the size of a pea to that of a black currant, the newly-developed ones smaller. Stem 3 inches to 1 foot high. Radical leaves ½ to 3 inches long. Spike 1 to 4 inches long, somewhat unilateral. Perianth horizontal or slightly drooping; the segments about ⅛ inch long, the upper sepal oblong, the lateral ones lanceolate. The petals narrower, rhombic-strapshaped. Labellum with the lateral lobes lanceolate, the middle lobe strap-shaped.

Musk Orchis.

French, *Ophrys à un tubercule.* German, *Einknollige Ragwurz.*

GENUS VII.—**OPHRYS.** *Linn.*

Perianth segments spreading; labellum turned downwards, without a spur. Anther wholly adnate to the column; its two cells subparallel, each containing a pollen-mass of which the elongate caudicule is affixed to a gland, each of the two glands contained in a separate pouch. Stigma without a rostellate process extending between the bases of the anther-cells, or a plate in front of them.

Herbs with subglobular tubers, of which the new one is sometimes produced at the extremity of a stolon. Flowers in a lax spike, few, large, and often bearing a striking similarity to an insect, of which the labellum represents the body, and the lateral sepals the wings.

The name is from ὀφρῦς (ophrus), the eyebrow; doubtless from the hairy humps at the base of the lateral lobes of the labellum in some of the commoner species.

SPECIES I.—OPHRYS APIFERA. *Huds.*

PLATE MCCCCLXVII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLVII.
Billot, Fl. Gall. et Germ. Exsicc. No. 3479.

Sepals pink or rose; labellum velvety, especially towards the margin, with glabrous markings, oval, semiglobose, with the sides reflexed, 3-lobed from from the base; the lateral lobes with humps at the base, and points produced beyond the margin of the labellum; the middle lobe with 2 reflexed segments with a long strapshaped-triangular sigmoid-reflexed appendage. Anther terminated by an acute reflexed process.

On chalk downs and the borders of fields and rough banks on chalky and limestone soils. Rather local, but generally distributed in the south of England, extending in the west as far north as Tenby; but in the east to the chalk districts of Yorkshire and the magnesian limestone of Durham. Rare, but widely distributed in the south and middle of Ireland, where it is recorded as occurring on sandhills, as well as in calcareous and clayey pastures.

England, Ireland. Perennial. Midsummer.

Rootknobs subglobular, from the size of a black currant to that of a large cherry, one of them often at the end of a short thick descending stolon. Leaves oblong-elliptical, rapidly decreasing in size upwards. Stem 6 inches to 2 feet high. Bracts commonly rather longer than the ovary, sometimes longer than the flowers. Flowers 2 to 5, rarely as many as 8 or 10. Calyx segments oblong-elliptical, boatshaped, fleshcolour or pink (rarely nearly white), greenish on the back, ½ to ⅝ inch long, spreading; petals much narrower and shorter than the sepals, strapshaped, downy on the inside; labellum about as long as the calyx segments, maroon purple with yellow markings; the lateral lobes more hairy than the middle lobe, especially at their prominent base, reflexed; the middle lobe most hairy towards the apex and margins, variously marked with yellow hues and dots; the terminal point bent first backwards and then forwards.

Bee Orchis.

French, *Ophrys abeille.* German, *Bienenähnliche Frauenthräne*

SPECIES II.—OPHRYS ARACHNITES. *Reichard.*

PLATE MCCCCLXVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXI.
O. fuciflora, *Reich. fil.* l.c. p. 85. *Crep.* Man. Fl. Belg. ed. ii. p. 93.

Sepals pink; labellum velvety, especially at the sides; subquadrate-ovate, slightly convex, with the sides not reflexed or but slightly reflexed, subentire, with the lateral lobes usually reduced to projecting humps; the terminal lobe notched with a rather long subrhomboidal or oblong-strapshaped subobtuse appendage in the same plane as the front of the labellum or curved inwards. Anther terminated by an acute reflexed or straight process.

On chalk downs and by the borders of fields. Very local. Not unfrequent about Folkstone, and said to have occurred near Sittingbourne; but I can find no trustworthy authority for its occurrence beyond the county of Kent.

England. Perennial. Summer.

Very similar to O. apifera, and, indeed, connected with it by intermediate forms; but these, I have no doubt, are hybrids, as they are always found where the two species grow together, but apparently never where one of them grows apart from the other. The difference between O. apifera and O. arachnites lies in the labellum, which in the latter is more spread out, broader towards the apex, and with the lateral lobes scarcely projecting beyond the general outline; the terminal appendage is never reflexed under the labellum; the colour of the labellum inclines to brown rather than to purple.

Late Spider Orchis.

French, *Ophrys frelon.* German, *Spinnen-Frauenthräne.*

SPECIES III.—OPHRYS ARANIFERA. *Huds.*

PLATES MCCCCLXIX. MCCCCLXX.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tabs. CCCCXLIX. and CCCCLXIV. Fig. 1. *Billot*, Fl. Gall. et Germ. Exsicc. No. 1333.

Sepals yellowish-green; labellum velvety, especially at the margins, with glossy glabrous markings, oval, half-ovoid, with the sides more or less reflexed, nearly entire or slightly 3-lobed at the base; the lateral lobes usually with humps at the base, and points scarcely produced beyond the margins; middle lobe nearly entire or notched, without an appendage, or more rarely with a minute tooth in the notch. Anther terminated by a short rather blunt straight process.

Var. *α*, *genuina.*

PLATE MCCCCLXIX.

O. aranifera, *Sm.* Engl. Bot. ed. i. No. 65. Engl. Fl. Vol. IV. p. 31. *Lindl.* Syn. Brit. Fl. p. 262.

Lateral petals glabrous or nearly so; labellum commonly lobed at the margin, more rarely entire.

Var. β, *fucifera.*

PLATE MCCCCLXX.

O. fucifera, *Sm.* Engl. Fl. Vol. IV. p. 32. *G. E. Smith,* Engl. Bot. Supp. No. 2649. *Lindl.* Syn. Brit. Fl. p. 262.

Lateral petals downy or roughish on the inner surface; labellum undivided, rarely more or less 3-lobed; lateral humps less prominent than in var. α.

On chalk downs and rough banks and borders of fields, in chalky or limestone districts. Local. Var. α has occurred in Kent, Suffolk, Cambridge, Northampton, and Oxford. It has also been reported from Salop and York, but on doubtful authority. Var. β has been found in Dorset (Mr. I. C. Mansel), Hants, Sussex, South Kent, and abundantly at Queentown Warren, near Hartlip, North Kent.

England. Perennial. Spring, early Summer.

A variable plant, usually smaller and more slender than O. apifera and O. arachnites, but sometimes attaining to as great a size. Flowers generally fewer, often only 2 or 3, but sometimes 6 or 8. Bracts herbaceous, the lower ones usually exceeding the ovary. Calyx segments pale yellowish-green on the inside, not rose-coloured or pink as in the two preceding, rather shorter, rarely above ½ inch long; labellum generally a little longer than the sepals, dull purple, with a somewhat glassy slate-coloured horseshoeshaped blotch giving off from the convex part of the horseshoe two stripes running towards the apex of the labellum, which are sometimes free, and sometimes united; the velvety part of the labellum soon changes into pale livid brown, inclining to yellow at the margins.

The British specimens I have seen were mostly destitute of any appendage or tooth in the notch of the terminal lobe, but I have seen the tooth in a few of the plants collected at Queentown Warren.

Vars. α and β can scarcely be separated; the roughness or downiness of the petals is really the only character which distinguishes each, for the lobing of the labellum is variable in both forms. There is no difference in the form of the petals as stated by Sir J. E. Smith, nor in the time of flowering. I have collected each of the two forms in flower from April up to the beginning of June, according to the earliness or lateness of the season and the warmth of the situation.

Early Spider Orchis.

French, *Ophrys araignée.* **German,** *Spinnenähnliche Frauenthräne.*

Orchid culture in England is almost a passion with some horticulturists, and brings to mind the Tulipomania of the seventeenth century, new and rare specimens being only attainable at a great price. In the Catalogue of the Cambridge Botanic Gardens for 1815, there occur the names of but a score or two varieties; now entire

houses are devoted to those lovely plants of tropical origin, and great expense is incurred in their culture. The greater number of Orchids require a damp and very warm atmosphere, unsuited to most other plants. Others, the natives of subtropical regions and temperate latitudes, do well under cool treatment, and recent cultivators are of opinion that they will become more generally and easily grown than has been thought possible. Shapes the most eccentric, and colours the most lovely, are produced in this genus of plants. It is remarkable, however, that, with all their variety of tints, *blue* is almost unknown among Orchids. Besides Orchids esteemed for their flowers, there is a class of terrestrial species remarkable for the exquisite pencilling of their foliage. These belong chiefly to the Javanese genus *Anæctochilus*, and, being extremely tender and delicate, are kept in pots with a bell-glass over them. The delicious condiment known as vanilla in confectionery, is the produce of a species of Orchis growing in tropical Asia and America. It belongs to the tribe *Arethuseæ*, and is the only one which possesses any economical value. The best vanilla comes from Mexico, and is imported into this country in the shape of black pod-like capsules.

SPECIES IV.—**OPHRYS MUSCIFERA.** *Huds.*

PLATE MCCCCLXXI.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCXLVII.
Billot, Fl. Gall. et Germ. Exsicc. No. 2380.
O. Myodes, *Jacq.* Misc. Vol. III. p. 373.

Sepals yellowish-green; labellum somewhat downy, with glossy glabrous markings, oblong, not convex longitudinally, with the sides more or less reflexed, 3-lobed at the middle; the lateral lobes without humps at the base, their points triangular-strapshaped, spreading; terminal lobe roundish-ovoid, notched or cut into 2 segments at the apex, without an appendage or tooth in the notch. Anther obtuse, without a terminal process.

On chalk downs and borders of fields and rough banks, on chalk and limestone soil. Generally distributed in the east of England, extending west to Somerset, Gloucester, Hereford, Shropshire, Anglesea and Lancaster, and north to Westmoreland and Durham. Rare in Ireland, and confined to the middle of the island, where it appears frequently to occur in bogs or boggy fields.

England, Ireland. Perennial. Summer.

Rootknobs subglobular or ovoid, from the size of a black currant to that of a damson plum. Stem 6 inches to 2 feet high. Leaves elliptical or oblong-elliptical, rarely oval, the largest 2 to 5 inches long, fewer in number, and narrower, towards the base than in the other British species. Flowers 4 to 12, far separated when expanded. Bracts herbaceous, the lower ones usually considerably exceeding the ovary. Sepals ¼ to ⅜ inch long; petals very narrow; labellum hanging down, about ½ inch long, maroon purple, with a dark slate-coloured shining transverse blotch at the base, horseshoeshaped on the upper side, and straight across, or with two projecting points towards the apex of the labellum; the labellum has scarcely any curvature from base to apex, and the lateral lobes are much farther from the base than in the other British species.

Fly Orchis.

French, *Ophrys mouche.* German, *Fliegenähnliche Frauenthräne.*

TRIBE II.—NEOTTIEÆ.

Anther terminal, attached to the column by its base, persistent; pollen-masses without stalks, consisting of subpulverulent grains which cohere but slightly.

GENUS VIII.—**SPIRANTHES.** *Rich.*

Perianth coloured; segments all connivent, the uppermost one more or less adherent to the inner lateral ones; the exterior lateral ones oblique, and covering the labellum at the base; labellum turned downwards, not spurred, with two callosities at the base, channelled and embracing the column in the basal portion, recurved at the apex, entire, not contracted in the middle. Column short, prolonged into a 2-toothed rostellum. Anther sessile, applied to the rostellum; pollen-masses clavate, without stalks, affixed to a common gland; pollen mealy.

Herbs with 2, 3, or more oblong or cylindrical tubers, and ovate, oblanceolate, elliptical, or strapshaped leaves, which are chiefly radical. Flowers small, white or pink, in a spike with 1 or 3 spiral ranks.

The name of this genus of plants is derived from *σπεῖρα* (speira), a spiral, and *ἀνθος* (anthos), flower.

SPECIES I.—**SPIRANTHES AUTUMNALIS.** *Rich.*

PLATE MCCCCLXXII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXIV.
Billot, Fl. Gall. et Germ. Exsicc. No. 1966.
Neottia spiralis, *Sw.* *Sm.* Engl. Bot. ed. iv. No. 35.
Ophrys spiralis, *Linn.* *Sm.* Engl. Bot. ed. i. No. 541.

Root with 2 or 3 lanceolate- or oblong-ovoid knobs. Radical leaves in a rosette at one side of the flowering-stem, not surrounding it, and appearing after it in autumn, oval or ovate or oval-elliptical; leaves on the flowering-stem minute, resembling bracts. Flowers in one twisted row, in a dense slender spike. Bracts concave, enclosing the ovary, acuminate-cuspidate.

In pastures and on banks on chalk and limestone soils. Rather sparingly but generally distributed in England, reaching north to York and Westmoreland. Local and rare in Ireland, where it is confined to the south and middle of the island.

England, Ireland. Perennial. Autumn.

Rootknobs commonly about the size of a shelled almond or date stone. Leaves appearing about September, in a lateral tuft, from the centre of which the flowering-stem of the next year is produced; petiole broad, sheathing; lamina, 1 to 1¼ inch long. Leaves not fully developed till the flowers have faded, and remaining green through the winter. Flowering-stem 3 to 9 inches high, with numerous small sheathing bractlike leaves, with acuminate-cuspidate points. Spike 1½ to 4 inches long. Bracts herbaceous, with white scarious margins, longer than the ovary. Perianth about ¼ inch long, greenish-white, curved, so that the apical portion is horizontal. Sepals triangular-lanceolate, about as long as the labellum, the base of which is enclosed by the two lower sepals; labellum oblong, crenulated at the apex, folded longitudinally into a gutter at the base, which embraces the acute column. Rachis, bracts, ovary, and perianth glandular-pubescent.

Autumnal Ladies' Tresses.

French, *Spiranthe automnale.* German, *Herbst Wendelorche.*

SPECIES II.—SPIRANTHES ÆSTIVALIS. *Rich.*

PLATE MCCCCLXXIII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXV.
Billot, Fl. Gall. et Germ. Exsicc. No. 467.
Neottia æstivalis, *D.C. Bab.* in Eng. Bot. Suppl. No. 2817.

Root with several cylindrical or terete thickened fibres. Radical leaves surrounding the base of the flowering-stem, strapshaped or narrowly elliptical-strapshaped; lowest leaves on the flowering-stem resembling the radical leaves but smaller, the upper ones minute, resembling bracts. Flowers in one twisted row, in a rather slender dense spike. Bracts concave, enclosing the ovary, acuminate-cuspidate.

In bogs. Very rare. In a bog in the New Forest, near Lyndhurst, on the road to Christchurch, Hants; Wyre Forest, Worcester; about St. Ouen's Pond, Jersey; and at Grand Mare, Guernsey.

England. Perennial. Late Summer, and early Autumn.

Rootfibres 2 or 3 inches long, about the thickness of a quill. Leaves appearing with the flowering stem, and sheathing its base, 2 to 6 inches long, gradually attenuated into an indistinct petiole; the tuft of leaves from which the flowering stem of the next season is to be produced may be found in a young state in the axil of the lowest leaf, but it is not developed till after the flowers have faded. Flowering stem 6 to 18 inches high. Spike 2 to 6 inches long. Flowers similar to those of S. autumnalis, but a little larger, with narrower sepals, and the labellum rather longer in proportion and more puberulent on the upper side at the apex. Rachis, bracts, ovary, and exterior of the sepals glandular-puberulent, the hairs being considerably shorter than in S. autumnalis.

Summer Ladies' Tresses.

French, *Spiranthe d'été.* German, *Sommer Wendelorche.*

SPECIES III.—**SPIRANTHES GEMMIPARA.** *Lindl.*

PLATE MCCCCLXXIV.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXVII. Figs. 23, 24.
S. cernua, *Bab.* olim Bot. Mag. No. 5277. *Benth.* Handbk. Brit. Bot. ed. ii. p. 455 (non *Rich*).
" S. Romanzoffiana, *Cham.*" *Reich. fil.* l. c. p. 153. *Asa Gray*, Man. Bot. of N. U. S. ed. v. p. 504.

Root with several cylindrical or terete thickened fibres. Radical leaves surrounding the base of the flowering stem, strapshaped-elliptical; lowest leaves on the flowering stem resembling the radical leaves, and scarcely smaller; uppermost leaves smaller, resembling the bracts. Flowers in 3 twisted rows in a rather thick dense spike. Bracts slightly concave, enclosing the ovary only at the base, acuminate. Sepals and lateral petals connivent; labellum ovate-oblong, contracted below the apex, with 2 smooth globular callosities at the base. Beak of the stigma short.

In pastures. Very rare, and found only in the county of Cork. The following account of its stations is given in the "Cybele Hibernica," p. 286:—"At Dunboy, on the strand of the mainland, opposite the Western Redoubt on Bear Island, Bantry Bay (Mr. J. Drummond, 1810), 'Flor. Cork.' On a meadow sloping towards Bearhaven (Mr. J. Woods, 1855). In a rushy meadow sloping to the sea, west of Castletown, on rather dry ground (Dr. E. Percival Wright)."

Ireland. Perennial. Late Summer, Autumn.

"Stem 5 to 15 inches high" (*A. Gray*). Leaves 3 to 4 inches long. "Spike 1 to 4 inches long" (*A. Gray*). Perianth segments nearly ¼ inch long, turned upwards at the apex; labellum about the same length, and turned downwards. Flowers of a purer white than in the two preceding species.

S. gemmipara approaches very closely to the North American S. cernua, but has the stem and leaves and spike usually shorter, the lateral sepals less distinctly connivent with the upper sepal and petals, the labellum more narrowed immediately below the apex, the callosities less prominent, blunter, wholly adnate, and not hairy; the column much broader under the stigmatic surface, and the beak of the rostellum shorter and split. Dr. Asa Gray considers that S. gemmipara is identical with S. Romanzoffiana. See "Proceedings of the Botanical Congress, 1866," p. 176.

The figure in "English Botany Suppl." of No. 2786, presents no resemblance whatever to the Irish plant. Our plate is taken from that given in the "Botanical Magazine," by permission of the publisher.

Three-ranked Ladies' Tresses.

The species of this genus are commonly known by the name of *Lady's traces*, which appears to be a corruption of the proper name, which was doubtless originally "Our Lady's tresses."

GENUS IX.—**GOODYERA.** *Brown.*

Perianth coloured; the upper 3 segments connivent and often partially adherent; the exterior lateral ones spreading, not oblique, but covering the labellum at the base; labellum turned downwards, not spurred at the base, without callosities on the lower part, but concave, saccate at the base, erect at the apex, entire, not contracted in the middle. Column short, prolonged into a 2-toothed (or rarely entire) rostellum. Anther subsessile, applied to the rostellum; pollen-masses obovate, without stalks, affixed to a common gland; pollen-grains loosely cohering.

Herbs with creeping brittle fleshy rootstocks and ovate radical leaves. Flowers small, usually glandular, downy, white, in a few-ranked spike which is generally unilateral, and slightly spiral.

This genus of plants was named in honour of John Goodyer, a Hampshire botanist and correspondent of Gerarde.

SPECIES I.—**GOODYERA REPENS.** *R. Br.*

PLATE MCCCCLXXV.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXXII.
Billot, Fl. Gall. et Germ. Exsicc. No. 1549.
Satyrium repens, *Linn.* *Sm.* Engl. Bot. ed. i. No. 289.

Leaves ovate or elliptical-oval, concolorous. Flowers in a unilateral slightly twisted spike. Labellum saccate at the base, with an ovate recurved point. Anther short, blunt. Beak of the stigma very short.

In fir-woods. Abundant in the north of Scotland, especially towards the east. The southernmost station is at Dalmeny, six miles from Edinburgh, where it was discovered by Mr. Claudio L. Serra. The next most southern stations are the Den of Dupplin and the woods of Scone, Perthshire: it is also reported from Forfarshire. In Kincardine, Aberdeen, Banff, and Moray it is abundant, extending into Ross and Inverness, which appear to be its northern limits.

Scotland. Perennial. Late Summer, early Autumn.

Rootstock slender, fleshy, creeping extensively among the rotting leaves of the Scotch fir. Leaves appearing at the close of autumn and remaining until the flowers fade in the autumn of the succeeding year, 1 to 1½ inch long, gradually attenuated into petioles shorter than the lamina, dark green, without any markings, somewhat fleshy. Flowering stem 6 to 15 inches high, a few of the lowest leaves resembling the radical ones, the rest sheathing and bractlike. Spike 1¼ to 5 inches long, with numerous flowers turned to one side, and slightly spiral. Bracts rather longer than the ovaries which they embrace, acuminate or acuminate-cuspidate, subherbaceous. Perianth segments about ¼ inch long, cream-white, all connivent; the sepals ovate, the lateral ones oblique; the labellum with an inflated saccate protuberance in the lower half. Rachis, bracts, ovary, and perianth glandular-pubescent, with jointed hairs.

Creeping Ladies' Tresses.

French, *Goodyère rampante.* **German,** *Kriechende Goodyere.*

GENUS X.—**LISTERA.** *R. Brown.*

Perianth subherbaceous; segments spreading, or the 5 upper ones connivent, free; labellum turned downwards, not spurred, nearly flat, pendulous, bifid at the apex, and sometimes toothed at the base, not contracted in the middle. Column short or very short. Rostellum elongated, entire, with a small round appendage at the apex. Anther sessile, applied to the rostellum; pollen-masses clavate, attached to a minute common gland; pollen mealy.

Herbs with slender fasciculated root-fibres. Stems commonly with a pair of opposite or subopposite leaves some distance above the base, below which the stem has merely a few sheaths at the base. Flowers small, minute, greenish, pointing in all directions, in a rather lax raceme.

The name of this genus of plants was given to it in honour of Dr. Martin Lister.

SPECIES I.—**LISTERA CORDATA.** *R. Br.*

PLATE MCCCCLXXVI.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXX.
Billot, Fl. Gall. et Germ. Exsicc. No. 174.
Neottia cordata, *Rich.* *Reich. fil.* l.c. p. 149.
Ophrys cordata, *Linn.* *Sm.* Engl. Bot. ed. i. No. 358.

Root-fibres few. Stem slender, fragile. Leaves 2, subopposite, sessile, deltoid-ovate or rhombic-deltoid, obtuse-angled or subcordate at the base. Flowers in a rather short lax raceme. Sepals and lateral petals spreading, the former strapshaped-oblong; labellum twice as long as the sepals, 3-lobed from the base; the lateral lobes linear-strapshaped; the middle lobe broader and more than twice as long as the lateral lobes, cleft at the apex about half-way up into 2 linear-strapshaped segments, which are longer than the lateral lobes. Column with a crest in which the anther is included.

In damp places on heaths and open woods. Generally distributed, but very scarce in the south of England. Not uncommon in the north and in Scotland, extending north to Orkney. Local, but widely distributed in Ireland, except in the south and middle of the island.

England, Scotland, Ireland. Perennial. Summer, Autumn.

Rootstock very slender, creeping, emitting slender brittle fleshy radical fibres. Stem 2 to 9 inches high, with 2 or 3 membranous sheaths at the base, and 2 leaves about the middle or below it; one of these leaves sheathes the other, but so closely that they appear to be opposite. Leaves from ½ to 1 inch long, deep shining green above, paler beneath, somewhat fleshy; rarely there are 3 or even 4 leaves all close together. Spike ¾ to 2½ inches long. Bracts much shorter than the pedicels, deltoid, yellowish-green. Perianth segments $\frac{1}{10}$ inch long; the labellum about ⅕ inch long; the whole yellowish-olive tinged with purplish-brown or dull reddish-purple. Rachis and pedicels glabrous.

Lesser Tway Blade.

French, *Néottie en cœur.* German, *Herzblättriges Zweiblatt.*

SPECIES II.—**LISTERA OVATA.** *R. Br.*

PLATE MCCCCLXXVII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXIX.
Billot, Fl. Gall. et Germ. Exsicc.
Neottia ovata, "*Bluff* et *Fingerhuth.*" *Reich. fil.* l.c. p. 147. *Crep.* Man. Fl. Belg. ed. ii. p. 296.
Ophrys ovata, *Linn.* *Sm.* Eng. Bot. ed. i. No. 1548.

Root-fibres numerous. Stem rather stout, not fragile. Leaves 2, subopposite, sessile, oval, not wedgeshaped nor cordate at the base. Flowers in a long rather lax raceme. Sepals and lateral petals subconnivent, the latter ovate-oblong; labellum more than twice as long as the sepals, broadly strapshaped, cleft at the apex about halfway up into 2 strapshaped segments, but destitute of lateral lobes. Column without a crest.

In woods and bushy places, especially when they are moist, and in meadows. Common and generally distributed, but not extending to Orkney.

England, Scotland, Ireland. Perennial. Summer.

Rootstock shortly creeping, with very numerous fleshy fibres about as thick as a bodkin. Stem 1 to 2 feet high, with 2 sheaths at the base, and 2 leaves about or below the middle. Leaves 2 to 7 inches long, with 3 to 5 strong longitudinal ribs, having fainter ones between them. Spike 3 to 9 inches long. Bracts scarcely half as long as the pedicels, ovate-deltoid, acuminated, yellowish-green. Perianth segments nearly $\frac{1}{5}$ inch long. The lateral sepals are a little removed from the connivent upper sepal and petals. The whole of the flowers yellowish-green. Stem above the leaves as well as the rachis and pedicels pubescent with jointed hairs.

Common Tway Blade.

French, *Néottie ovale.* German, *Eiblättriges Zweiblatt.*

GENUS XI.—**NEOTTIA.** *Linn.*

Perianth coloured, the five upper segments hooded and connivent; labellum turned downwards, not spurred, slightly concave at the base, pendulous, bifid at the apex, not contracted in the middle. Column rather short, prolonged into a broad flat entire rostellum without a process at the apex. Anther sessile, applied to the rostellum; pollen-masses clavate-cylindrical, attached to a common gland; pollen mealy.

Herbs with thickened fleshy root-fibres in numerous rows, forming a dense mass, and stems without green leaves, but with scarious sheaths representing them. Flowers rather large, in a dense raceme, interrupted below, pointing in all directions, and, as well as the whole plant, dull fawn-colour.

The name is from *νεοττιά* (neottia), a bird's-nest, to which the fasciculated root is compared.

SPECIES I.—**NEOTTIA NIDUS-AVIS.** *Rich.*

PLATE MCCCCLXXVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXIII.
Listera Nidus-avis, *Hook.* *Sm.* Engl. Fl. Vol. IV. p. 38. *Hook. & Arn.* Brit. Fl. ed. viii. p. 430.
Ophrys Nidus-avis, *Linn.* *Sm.* Eng. Bot. ed. i. No. 48.

Stem stout. Bracts lanceolate-acuminate. Sepals and lateral petals oval-oblong, subconnivent; labellum oblong, concave at the base, split scarcely half-way up into two oblong semilunar blunt divaricate segments. Column not hooded.

In moist woods and copses, especially on chalky soil, growing amongst dead leaves. Rather frequent in England; more rare in Scotland, and not reaching north of Forfar, Moray, and Argyle. Very rare in Ireland, and found only in the east and north-east.

England, Scotland, Ireland. Perennial. Early Summer.

Rootstock shortly creeping, descending towards the apex, very densely clothed with thick cylindrical pale fawn-colour simple root-fibres, from the point of which it is stated new plants are produced (see *Leight.* Fl. Shrop. p. 434). Flowering stem produced from the apex of the rootstock, sharply curved at the base, then erect, 9 to 18 inches high, stout, clothed with numerous scarious sheaths. Raceme spikelike, 2 to 8 inches long, usually lax and interrupted at the base, dense towards the apex, blunt. Bracts scarious, longer than the pedicel, shorter than the ovary. Sepals about $\frac{1}{4}$ inch long; labellum about $\frac{1}{2}$ inch. Whole plant, including the flowers, light brownish fawn-coloured.

Bird's-nest Orchis.

French, *Néottie nid d'oiseau.* German, *Gemeines Vogelnest.*

GENUS XII.—**EPIPACTIS.** (*Crantz.*) *Rich.*

Perianth subherbaceous or coloured; segments all spreading or spreading-incurved, free; labellum turned downwards, not spurred, concave at the base, constricted in the middle so as to have a terminal more or less pointed ovate or transverse terminal flat lobe with two prominent folds at the base on the upper side. Column short; rostellum short, subquadrate. Anther sessile; pollen-masses clavate-cylindrical, attached to a common gland; pollen mealy.

Herbs with oval or elliptical sessile amplexicaul leaves, the lowest ones generally reduced to sheaths. Flowers horizontal or drooping, in lax subunilateral racemes, commonly greenish or reddish.

The derivation of this genus is thus given: ἐπὶ, upon, and πακτίς, a pointed elevation, from the anther being placed on the summit of the column.

SPECIES I.—**EPIPACTIS HELLEBORINE.** *Crantz.*

PLATES MCCCCLXXIX. MCCCCLXXX. MCCCCLXXXI.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. p. 141.
E. latifolia. *Benth.* Handk. Brit. Fl. ed. ii. p. 452. *Hook. & Arn.* Brit. Fl. ed. viii. p. 428.

Rootstock shortly creeping, producing buds from which new stems are developed, but no elongate stolons. Flowers numerous. Lowest bracts usually larger than the flowers. Labellum not exceeding the sepals, constricted between the middle and the apex, the basal portion not produced into lobes at the sides, the apical portion acute or apiculate and recurved at the apex, entire or nearly entire on the margins, with thick bosses converging towards the apex, and usually confluent. Ovary thick in flower, fusiform-turbinate.

SUB-SPECIES I.—**Epipactis media.** "*Fries.*" *Bab.*

PLATE MCCCCLXXIX.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXXVI. Fig. 1, and CCCCLXXXVII.
Bab. Man. Brit. Bot. ed. vi. p. 333 (an *Fries ?*).
E. Helleborine, var. varians. *Reich. fil.* l. c. p. 142.
E. viridiflora, "*Hoffm.*" *Boreau,* Fl. du Centre de Fr. ed. iii. Vol. II. p 657.

Leaves rather distant; the lower ones oblong-oval; the upper ones lanceolate, gradually attenuated to the apex. Flowers in a rather lax raceme, which is scarcely unilateral. Sepals or lateral petals lanceolate, gradually attenuated to the apex, as long as the ovary when in flower, widely spreading; labellum nearly as long as the sepals; its apical portion deltoid-triangular, acute, with the basal bosses plicate-rugose. Flowers pale yellowish-green, or more or less tinged with purple.

Var. α, *viridis.*

Plant green, not tinged with purple.

Var. β, *purpurata.*

E. purpurata. *Sm.* Engl. Fl. Vol. IV. p. 41. *J. Forbes* in Engl. Bot. Suppl. No. 2775.

Plant more or less tinged with "purple lilac." (*J. Forbes.*)

In woods. Rare. Near Reigate, Dorking, and Claygate, Surrey, and "Affmore Forest" are the only places from which I have specimens; but it is reported from numerous counties, from Sussex and Kent as far north as Linlithgow. Smith described his E. purpurata from a specimen found by the Rev. Dr. Abbot in a wood near the Norys Farm, at Leigh, Worcestershire, and the figure in "English Botany Suppl." was drawn from a specimen procured by Mr. J. Forbes from woods at Woburn Abbey, Bedford. In Ireland it has been noticed at Killarney, co. Kerry; in co. Dublin; and in woods at Glenarm Park, co. Antrim.

England, Scotland (?), Ireland. Perennial. Late Summer, early Autumn.

Stem solitary from the extremity of the branches of the rootstock, slender, wiry, 2 to 3 feet high. Lowest leaves 1½ to 2 inches long, by ¾ to 1 inch broad; middle leaves 2½ to 4 inches long, much narrower in proportion; uppermost leaves still narrower, and passing gradually into bracts. Raceme 6 to 9 inches long, with numerous flowers spreading towards all sides but one. Perianth segments nearly ½ inch long.

The Reigate and Claygate plants are the only ones I have seen in a living state. These are not at all tinged with purple, and have the flowers pale yellowish-green, with the labellum sometimes as long as the calyx segments, but generally a little shorter.

Specimens of E. violacea, *Durand-Duquesnay*, from Lisieux, agree well with E. purpurata, *Sm.*, but the French plant is said to have a thickened rhizome, producing tufts of stems, which I cannot verify from my specimens, which are only detached stems. The Reigate plant grows in dense tufts, but each stem, or at most each pair of stems, comes from a separate branch of the rootstock.

I cannot be sure that this is E. media of Fries, from his quoting Reichenbach's figure of E. atrorubens, and from several points in his description, especially as, in comparing it with E. latifolia, he observes the flowers are smaller than those of E. latifolia. I have not access to the "Herbarium Normale," which may prove that he included E. purpurata, *Sm.* in his E. media.

Narrow-leaved Helleborine.

SUB-SPECIES II.—**Epipactis latifolia.** *All.*

PLATE MCCCCLXXX.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXXVIII.
Billot, Fl. Gall. et Germ. Exsicc. No. 173.
Bab. Man. Brit. Bot. ed. vi. p. 333.
E. latifolia, var. *a*, *Hook. & Arn.* Brit. Fl. ed. viii. p. 428.
E. Helleborine, var. viridans, *Crantz. Reich. fil.* l.c. p. 143.
Scrapias latifolia, *Linn. Sm.* Engl. Bot. ed. i. No. 269.

Leaves of the middle of the stem approximate; the lower ones broadly ovate or suborbicular-ovate; the upper ones ovate-lanceolate;

all acute or shortly and abruptly acuminate. Flowers in a rather dense unilateral raceme. Sepals and lateral petals ovate or ovate-lanceolate, acuminate, rather shorter than the ovary when in flower, incurved-spreading; labellum shorter than the sepals; its apical portion roundish-deltoid, obtuse, apiculate, with the point recurved, and the basal bosses smooth. Flowers greenish or white, or more or less tinged with purple.

In woods and shady places. Not very common, but generally distributed in England. More rare in Scotland, except in the west, and not extending to Orkney. Local, but widely distributed in Ireland.

England, Scotland, Ireland. Perennial. Autumn.

Stem 1 to 3 feet high. Largest leaves 2 to 7 inches long by 1 to 4 inches wide, more approximate and more plicate than those of E. media; the uppermost ones narrow, and resembling the bracts. Raceme 3 inches to 1 foot long, more unilateral than that of E. media. Sepals about $\frac{3}{10}$ to $\frac{4}{10}$ inch long, very variable in colour, more incurved than those of E. media; the terminal portion of the labellum is also more rounded. The plant flowers nearly a month later than E. media.

Broad-leaved Helleborine.

French, *Épipactis à larges feuilles.* German, *Breitblättrige Sumpfwurz.*

SUB-SPECIES III.—**Epipactis atrorubens.**

PLATE MCCCCLXXXI.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXXV.
Billot, Fl. Gall. et Germ. Exsicc. No. 1073.
E. rubiginosa, *Koch,* Syn. Fl. Germ. et Helv. ed. ii. p. 801.
E. latifolia, var. β, *Sm.* Engl. Fl. Vol. IV. p. 41. *Hook. & Arn.* Brit. Fl. ed. viii. p. 428.
  Helleborine, var. rubiginosa, *Crantz.* *Reich. fil.* l. c. p. 141.
  ovalis, *Bab.* Engl. Bot. Suppl. No. 2884, and Man. Brit. Bot. ed. vi. p. 333.
  media, *Fries,* Mant. ii. p. 54, and Summ. Veg. Scand. p. 62, ex parte (?).

Leaves about or below the middle of the stem, approximate, ovate or ovate-lanceolate; the upper ones narrowly lanceolate; all acute and generally shortly acuminate. Flowers in a lax unilateral raceme. Sepals and lateral petals ovate or ovate-lanceolate, shorter than the ovary when in flower, spreading-incurved; labellum about as long as the sepals, the terminal portion transversely oval, suborbicular, obtuse, apiculate, with the basal bosses plicate-rugose. Flowers dark dull red, rarely greenish.

On ledges of (limestone ?) rock. Very local. Little Doward Hill, Herefordshire; Orme's Head, Carnarvon; Settle, Yorkshire; Durness, Sutherland; Burram and other hills, co. Clare. I have seen specimens only from Settle and Orme's Head.

England, Scotland, Ireland. Perennial. Late Summer, early Autumn.

Stem slender, wiry, 6 inches to 2 feet high. Largest leaves 2 to 4 inches long, narrower than those of E. latifolia, but in other respects similar. Bracts smaller, even the lower ones but rarely exceeding the flowers. Sepals little more than ¼ inch long, incurved, with spreading tips as in E. latifolia; the terminal portion of the labellum broader than long, but with rugose bosses like those of E. media. The plant flowers about six weeks earlier than E. latifolia.

I am indebted to Mr. John Tatham for fresh examples of the Settle plant. This has the flowers of a dull deep red. Miss Smith, of Rugeley, has favoured me with fresh specimens of the Orme's Head plant: these were similar to the Settle plants, except that the stems were shorter and the flowers green only slightly tinged with dark red.

As remarked under E. media, I am strongly inclined to think that E. atrorubens is the plant Fries had in view in his second Mantissa. The only point in his description which does not agree with E. atrorubens is where he describes the leaves as "æqualiter acuminatus;" whereas E. atrorubens generally, though not always, has them abruptly acuminated at the very apex, though to a less extent than in E. latifolia.

Oval-leaved Helleborine.

SPECIES II.—EPIPACTIS PALUSTRIS. *Crantz.*

PLATE MCCCCLXXXII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXXXIII.
Billot, Fl. Gall. et Germ. Exsicc. No. 1551.
E. longifolia, "*Schmidt*, in *Meyer* Phys. Aufs. 1791, p. 25," test. *Reich. fil.*
Serapias longifolia, *Linn.* Syst. Nat. ed. xii. vol. ii. p. 593.
S. palustris, *Lightf.* *Sm.* Engl. Bot. ed. i. No. 270.

Rootstock extensively creeping, producing elongated slender stolons. Flowers rather few. Bracts all shorter than the flowers. Labellum slightly exceeding the sepals, constricted between the base and the middle, the basal portion produced into triangular lobes at the sides, the apical portion transversely ovate, suborbicular-obtuse, not apiculate, strongly crenate on the margins, with faintly marked narrowly-linear basal bosses. Ovary slender while in flower, fusiform-cylindrical.

In marshes and swampy meadows. Rather rare. Generally distributed in England. Rare in Scotland, where it extends on the east to Dalkeith, Edinburgh, and the south side of the county of Fife; but on the west it has been reported only from the Isle of Skye, where it was found by Lightfoot. Local and rather rare in Ireland, where it is confined to the north and middle of the island.

England, Scotland, Ireland. Perennial. Late Summer, early Autumn.

Stem 6 to 18 inches high, slender, wiry above. Lower leaves 2 to 6 inches long, oval-oblong, rather blunt; the intermediate ones longer and narrowly elliptical-lanceolate; uppermost leaves strapshaped-lanceolate. Spike 3 to 6 inches long. Flowers horizontal or slightly drooping, with much longer, more slender, and more puberulent ovaries than those of any of the forms of E. Helleborine. Sepals about ½ inch long, lanceolate, greyish-green, striped. Petals rather shorter than the sepals, white veined with purplish-red at the base; labellum white, marked with purplish-red striæ and a few yellowish dots.

Marsh Helleborine.

French, *Épipactis des marais.* German, *Gemeine Sumpfwurz.*

GENUS XIII.—CEPHALANTHERA. *Rich.*

Perianth coloured; segments all connivent; labellum turned downwards, saccate or very shortly spurred, concave towards the base, constricted in the middle so as to have a terminal more or less pointed ovate or transverse terminal recurved lobe without prominent bosses at the base. Column elongate; rostellum none. Anther shortly stalked, moveable; pollen-masses clavate, not attached to a common gland; pollen mealy.

Herbs with oval-elliptical or lanceolate sessile and amplexicaul leaves, the lowest ones reduced to sheaths, and large white or pink suberect sessile flowers in lax spikes.

This genus derives its name from κεφαλή, the head, and *anthera*, anther.

SPECIES I.—CEPHALANTHERA RUBRA. *Rich.*

PLATE MCCCCLXXXIII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXIX.
Billot, Fl. Gall. et Germ. Exsicc. No. 3237.
Epipactis rubra, *Swartz; Sm.* Engl. Fl. Vol. IV. p. 45. *Lindl.* Syn. Brit. Fl. p. 259. *Hook. & Arn.* Brit. Fl. ed. viii. p. 429.
Serapias rubra, *Linn.* *Sm.* Engl. Bot. ed. i. p. 437.

Leaves of the middle of stem elliptical-lanceolate, very acute. Bracts strapshaped, acute, longer than the ovary, and about as long as the flowers. Sepals and lateral petals similar, elliptical-lanceolate, acuminate, acute, purplish-rose; labellum constricted between the base and the middle; the apical portion deltoid-ovate-acuminate, white with a rose-coloured border, and marked with numerous yellowish interrupted longitudinal crests; basal portion not swollen below, saccate, but without an evident spur at the base. Rachis and ovaries conspicuously glandular-puberulent.

In woods and bushy places on chalky soil. Very rare. "Quantock Hills, Somerset," Rev. J. C. Collins, 1836. On a steep stony bank sloping to the south on Hampton Common, Mrs. Smith, of Barnam House, *teste* Smith, "English Botany;" and Pitchcombe Wood, Gloucester, whence I have been favoured with fresh specimens by Mr. G. S. Wintle, and with dried ones by Dr. St. Brody, gathered in 1864-65.

England. Perennial. Summer.

Rootstock creeping, nearly perpendicular, slender, with numerous cylindrical radical fibres. Stem slender, wiry, striated, 9 to 18 inches high, sheathed at the base. Lowest leaves oval-oblong; intermediate ones narrowly elliptical-lanceolate; uppermost strapshaped-lanceolate. Spike 3 to 6 inches long, lax. Lowest bracts exceeding the ovary, strapshaped-acuminate. Flowers 3 to 15. Sepals ⅝ inch long, bright purplish-rose (magenta); labellum whitish, with the terminal segment acuminated into a point, the basal portion with two oblong-rhombic lateral lobes, and with the rudiment of a spur at the base. Pollen-masses slate-colour.

Red Helleborine.

French, *Épipactis rouge.* German, *Rothes Zymbelkraut.*

SPECIES II.—CEPHALANTHERA ENSIFOLIA. *Rich.*

PLATE MCCCCLXXXIV.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXX.
C. Xiphophyllum, *Reich. fil.* l. c. p. 135.
Epipactis ensifolia, *Sw.* *Sm.* Eng. Fl. Vol. IV. p. 44. *Hook.* & *Arn.* Brit. Fl. ed. viii. p. 429. *Lindl.* Syn. Brit. Fl. p. 259.
E. xiphophylla, "*Sw.* Orchid. p. 65," test. *Sm.*
Serapias ensifolia, "*Linn.*" *Sm.* Engl. Bot. ed. i. No. 494.
S. Xiphophyllum, *Linn. fil.* Suppl. p. 404.

Leaves of the middle of the stem lanceolate-elliptical or lanceolate-strapshaped, very acute. Bracts (except sometimes the lowest one) lanceolate-strapshaped or triangular, acute; the uppermost ones very minute, shorter than the ovary. Sepals elliptical-lanceolate, acuminate, acute. Petals oblong-elliptical, obtuse, and, as well as the sepals, pure white; labellum constricted a little below the middle (i.e. between the middle and the apex); the apical portion transversely oval-deltoid, obtuse, white with a yellow spot, and marked with numerous yellowish interrupted longitudinal crests; the basal portion not swollen below and subsaccate, but without any spur at the base. Rachis and ovaries indistinctly glandular-pubescent or subglabrous.

In woods. Locally distributed over the greater part of Britain from Hampshire and Sussex, north to Fife and Perth and Argyleshire. Very rare in Ireland, where it occurs in the south-west and in the north.

England, Scotland, Ireland. Perennial. Early Summer.

Rootstock creeping, with wiry fibres. Stem 9 inches to 2 feet high. Sheaths at the base of the stem loose at the apex. Lowest leaves oval or oblong-oval, the intermediate ones the largest, 3 to 8 inches long; the upper ones smaller. Spike 3 to 5 inches long, 5- to 12-flowered. Bracts generally abruptly smaller than the uppermost leaves and shorter than the ovary, but sometimes one or two of the lowest ones are leaflike and conspicuously exceed the ovary or even the flowers. Flowers $\frac{3}{4}$ inch long, about equal to the ovary, narrowed towards the base. Sepals longer than the petals, decidedly acuminate and acute, while the petals are rounded at the apex. Pollen-masses white. Leaves deep green, rather thin and dry in texture.

Long-leaved Helleborine.

French, *Épipactis blanc de neige.* German, *Schwertblättriges Zymbelkraut.*

SPECIES III.—**CEPHALANTHERA GRANDIFLORA.** *Bab.*

PLATE MCCCCLXXXV.

Reich. Ic. Fl. Germ. et Helv. Vol. XII. Tab. CCCCLXXI. and CCCCLXXII. Fig. 1.
Billot, Fl. Gall. et Germ. Exsicc. No. 2236.
C. Lonchophyllum, *Reich. fil.* l. c. in Tab.
C. pallens, *Rich.* *Koch,* Syn. Fl. Germ. et Helv. ed. ii. p. 800. *Fries,* Summ. Veg. Scand. p. 62. *Hartm.* Skand. Fl. ed. ix. p. 192.
Epipactis grandiflora, *Swartz.* *Sm.* Engl. Fl. Vol. IV. p. 43. *Hook. & Arn.* Brit. Fl. ed. viii. p. 429.
E. pallens, *Willd.* Spec. Pl. Vol. IV. p. 85.
Serapias grandiflora, *Lightf.* *Sm.* Engl. Bot. ed. i. p. 271.
S. Lonchophyllum, *Linn. fil.* Suppl. p. 405.

Leaves of the middle of the stem elliptical or ovate-elliptical, acute. Bracts, or at least the lower ones, foliaceous, lanceolate-strapshaped, much longer than the flowers; uppermost ones much smaller, and about as long as the ovary. Sepals oval-oblong, scarcely acuminate, subobtuse. Petals oblong-elliptical, obtuse, and, as well as the sepals, cream-white; labellum constricted about the middle; the apical portion suborbicular, deltoid, obtuse, white with a yellow spot, and with 3 to 5 yellow interrupted longitudinal crests; the basal portion swollen below and subsaccate but without any spur at the base. Rachis and ovaries indistinctly glandular-pubescent, or subglabrous.

In woods and bushy places, especially on chalky soil. Frequent in the south of England, but becoming rare in the north. I have not seen specimens from farther north than Gloucester, Oxford, and Essex; but it certainly occurs, though very sparingly, in Cambridgeshire and Herts. It is reported from Nottingham, Derby, Lancashire, Westmoreland, Perth, Isle of Arran, and Argyle; but these counties require confirmation. In the Scotch stations, in all probability, the plant found was C. ensifolia.

England, Scotland ? Perennial. Summer.

C. grandiflora is very similar to C. ensifolia, but it is a stouter plant, and the rootstock often produces numerous stems, so that the plant grows in tufts; these stems are 1 to 2 feet high, the leaves are broader than those of C. ensifolia and much shorter, 2 to 4 inches at the time of flowering. The leaves decrease more gradually upwards, and the lower bracts are similar to the leaves but narrower. The flowers are rather larger, about ⅝ inch long, of not so pure a white, not so much attenuated at the base, especially on the lower side, where the basal portion of the labellum is tumid. The spike also occupies a greater portion of the stem, often nearly as much as one half of it. I have seen it nearly a foot long when the stems were 2 feet high. The flowers are more erect, and the leaves are thicker.

White Helleborine.

French, *Épipactis blanc-jaunâtre.* German, *Grossblüthiges Zymbelkraut.*

TRIBE III.—ARETHUSEÆ.

Anther terminal, ultimately free, deciduous; pollen-masses stalked, consisting of grains which are pulpy or subpulverulent, but more or less coherent.

GENUS XIV.—**EPIPOGUM.** *Gmel.*

Perianth coloured; segments spreading-ascending, all turned in the opposite direction from the labellum; labellum uppermost, spurred at the base, 3-lobed, the lateral lobes small and spreading, very large, entire, concave, glandular on the inside. Column short, semicylindrical. Anther terminal, ultimately free and lidlike, stalked; pollen-masses 2, stalked, with the stalks united to a single gland; pollen pulpy.

A herb with a coral-like rootstock producing a sheathed leafless stem. Flowers large, in a lax raceme, yellow with a white lip, with purple tubercles.

This genus owes the origin of its name to the Greek words ἐπί, up, and πώγων, a beard, from the crested labellum of the flowers being turned upwards.

SPECIES I.—EPIPOGUM* APHYLLUM. *Sw.*

PLATE MCCCCLXXXVI.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCLXVIII.

Epipogum Gmelini, *Rich.* *Hook.* & *Arn.* Brit. Fl. ed. viii. p. 432. *Hook.* in Bot. Mag. No. 4821. *Koch,* Syn. Fl. Germ. et Helv. ed. iii. p. 799. *Gren.* & *Godr.* Fl. de Fr. Vol. III. p. 274.

Satyrium Epipogium, *Linn.* Sp. Pl. p. 1338.

The only known species.

In damp woods. Very rare. Found (once only) by Mrs. W. Anderton Smith at Tedstone Delamere, near Bromyard, Herefordshire.

England. Perennial. Late Summer, early Autumn.

Rootstock fleshy, branched so as to resemble coral, pale brown, very similar to that of Corallorrhiza, but the branches have a few small scarious scales. Stem fleshy, 3 to 10 inches high, swollen a little above the point where it leaves the rootstock, with a few remote scales, but without green leaves. Flowers solitary, or in a 2- to 7-flowered raceme. Bracts ovate, 3-nerved, scarious. Pedicel shorter than the ovary, straight, and as well as the ovary not twisted, so that the labellum of the flower is turned upwards. Sepals ½ to ⅝ inch long, narrowly lanceolate, involute, pale yellowish, connivent. Petals similar, but longer; labellum about as long as the sepals, turned upwards and backwards so as to be widely separated from the other segments, constricted between the base and the middle, the basal portion with roundish lateral lobes, the terminal portion deltoid-ovate, shortly acuminate, crenate-denticulate at the margin, white, the disk with a longitudinal furrow, on each side of which there are two rows of purple crests or tubercles; spur nearly as long as the labellum, and decurved so as nearly to touch it at the apex, very thick and blunt. Stem yellowish, often with reddish striæ.

Of this plant I have not seen British specimens.

Leafless Epipogium.

French, *Épipogon sans feuilles.* German, *Blattloser Widerbart.*

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* This is Gmelin's spelling; but it is as often written *Epipogium.* Properly, it ought to be *Epipogon*, according to the form of the Greek πώγων, adopted in those cases where it is used as part of the name in the genera of Orchidaceæ.

GENUS XV.—CORALLORRHIZA. *Haller.*

Perianth subherbaceous, the five upper segments incurved, connivent; labellum about as long as the other segments, turned downwards, with a short spur or swelling at the base often adherent to the summit of the ovary, with two callosities on the inside near the base, 3-lobed, the lateral lobes minute, the terminal one emarginate. Column erect, rather short, semicylindrical. Anther terminal, resembling a lid; pollen-masses 4, obliquely incumbent, free; pollen waxy or subpulverulent.

Herbs with the rootstocks branched like coral, fleshy; the stem with scarious sheaths, but destitute of green leaves. Flowers small, greenish-brown, spreading or drooping, in a lax spikelike raceme.

The name of this genus is derived from *κοράλλιον*, coral, and *ῥίζα*, a root.

SPECIES I.—CORALLORRHIZA INNATA. *R. Br.*

PLATE MCCCCLXXXVII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. XD.
Billot, Fl. Gall. et Germ. Exsicc. No. 289.
Ophrys Corallorrhiza, *Linn.* *Sm.* Engl. Bot. No. 1547.

Flowers 3 to 12, in a lax spikelike raceme; pedicels much shorter than the ovary. Labellum oblong, 3-lobed between the base and the middle, the lateral lobes minute-triangular, the apical lobe emarginate or indistinctly 3-toothed; spur very minute, adnate to the ovary.

In boggy woods. Rare. It occurs near Irvine, Ayrshire; Ravelrig Toll Moss, and near Currie, Edinburgh; near Dunfermline, Fifeshire; near Culross, and formerly also in the woods of Methven Castle, Perthshire; Sands of Barry, Forfar; near Contin, and Head of Little Loch Broom, Ross; and in Moray.

Scotland. Perennial. Early Summer.

Rootstock fleshy, branched, resembling coral, pale yellowish. Stem 3 to 10 inches high, with a few sheaths, but no green leaves. Flowers spreading-ascending, afterwards horizontal; fruit drooping. Bracts very minute. Pedicels scarcely distinguishable from the narrowed base of the ovary until the fruit is formed. Perianth segments about ⅕ inch long, the upper sepal lanceolate, connivent with the petals; the lateral sepals strapshaped, bent downwards close to the labellum, which is about the same length, and has usually two very minute lobes, one on either side near the base; spur very minute, adnate to the summit of the ovary. Whole plant olive; the flowers paler; labellum whitish, spotted with purplish raised spots.

Common Coral Root.

French, *Coralline de Haller.* **German,** *Eingewachsene Korallenwurz.*

TRIBE IV.—MALAXIDEÆ.

Anther terminal, free, resembling a lid, persistent or deciduous; pollen-masses not stalked, composed of waxy cohering granules.

GENUS XVI.—**LIPARIS.** *Rich.*

Perianth subherbaceous; segments spreading, all (except the labellum) similar; labellum uppermost, as long as and much broader than the other segments, flat, entire, not spurred at the base. Column long, semicylindrical, inflexed. Anther terminal, lidlike, deciduous, terminated by a membranous appendage; pollen-masses cohering in pairs, in one row, attached in pairs to two glands; pollen waxy.

Herbs growing in wet places, with the base of the stem swollen and surrounded by sheaths, the new bulb formed alongside of the old one, producing 2 root-leaves and a short scape bearing a raceme of small greenish-yellow or purplish flowers, remarkable for having the lip upwards; all the preceding genera (except Epipogum) having either the ovary or the stalk of the flower twisted so as to bring the labellum downwards.

The name of this genus is derived from the Greek word λιπαρός, greasy, from the appearance of the leaves.

SPECIES I.—**LIPARIS LOESELII.** *Rich.*

PLATE MCCCCLXXXVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCXCII.
Billot, Fl. Gall. et Germ. Exsicc. No. 3238.
Sturmia Löselii, *Reich.* *Bab.* Man. Brit. Bot. ed. vi. p. 335. *Koch,* Syn. Fl. Germ. et Helv. ii. 803. *Reich. fil.* l. c. p. 161.
Malaxis Löselii, *Sw.* *Sm.* Eng. Fl. Vol. IV. p. 48.
Ophrys Löselii, *Linn.* *Sm.* Eng. Bot. No. 47.

Leaves 2, oblong-elliptical, keeled. Stem leafless, triangular. Sepals lanceolate-strapshaped; the petals narrower; labellum oblong-obovate, mucronate, shorter than the sepals, yellowish-green.

In spongy bogs. Rare, and now nearly extinct from the drainage of the fens. Said to have been found at Ham Ponds, near Sandwich, Kent; but if it ever occurred there, it is now extinct. Bogs at Lakenheath and Tuddenham Heath, Suffolk; St. Faith's bogs, near Norwich, and Royden Fen, near Diss, Norfolk: in the latter it was found as lately as 1855, by Miss Barnard. In several moors at Cambridge; Hinton Moor, about the year 1800; and Teversham Moor, in 1723; Burwell Fen, near Reche, in 1836, by Dr. J. A. Power; Bottisham Fen, by Professor Henslow; and, I believe, two or three plants were found in Wicken Fen as lately as 1863.

England. Perennial. Summer.

Rootstock enveloped in soft whitish sheaths, producing an offshoot at the side from which the stem of the succeeding year is developed. Leaves radical, their stalks enveloped by 2 (rarely 3) subscarious sheaths; lamina 1 to 3½ inches long. Stem 3 to 8 inches high. Raceme ¾ to 4 inches long. Bracts of the lower flowers strapshaped, longer than the flowers; the upper bract, or sometimes all of them, minute and shorter than the ovary. Pedicels shorter than the ovary, at first ascending, afterwards erect. Sepals about ¼ inch long. Whole flower greenish-yellow; the labellum rather darker, channelled, undulated, or slightly crenate. Leaves very smooth, bright green.

There is no sufficient reason for adopting the name Sturmia, on account of Liparis having been previously in use in zoology. If this rule were carried out, it would change hundreds of the more modern names in the vegetable and animal kingdoms. Professor Reichenbach himself, in "Seeman's Journal of Botany," 1865, p. 2, writes, "I am "a decided opponent of the view that the same generic name could "not be used both in the animal and vegetable kingdoms, making ex"ception only that the generally known names of animals cannot be "received in botany."

Fen Orchis.

German, *Lösel's Glanzkraut*

GENUS XVII.—**MALAXIS.** *Schwartz.*

Perianth subherbaceous, spreading, the sepals much larger than the petals; labellum uppermost, shorter and not broader than the sepals, concave, entire, not spurred at the base. Column very short, straight. Anther terminal, lidlike, persistent, without an apical appendage; pollen-masses 4, combined in pairs, obliquely incumbent, all attached to a single gland; pollen waxy.

A small herb growing in sphagnous bogs, with the base of the stems swollen and surrounded by sheaths, the new bulb formed above the old one. Leaves few, the upper ones larger. Flowers rather numerous, minute, yellowish-green, in a spikelike raceme, otherwise as in Liparis.

The derivation of the name of this genus is from μαλάσσω, I soften.

SPECIES I.—**MALAXIS PALUDOSA.** *Swartz.*

PLATE MCCCCLXXXIX.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCXCIV.
Billot, Fl. Gall. et Germ. Exsicc. No. 78.
Ophrys paludosa, *Linn.* Sp. Pl. p. 1341.

The only known species.

In bogs on Sphagnum. Rather scarce, but widely distributed, from Devon, Hants, and Kent, north to Sutherland and Ross. Rare and local in Ireland, but distributed from south to north.

England, Scotland, Ireland. Perennial. Late Summer, Autumn.

Rootstock a bulb clothed with soft whitish sheaths. Leaves 3 to 5, obovate or oblong-obovate, concave, obtuse, acute or apiculate, often fringed with minute bulbules. Stem 1 to 4 inches high, slender, with five angles. Raceme ½ inch to 2 inches long, rather lax. Pedicels shorter than the ovary. Bracts minute, lanceolate, subscarious, about as long as the pedicels. Sepals broadly lanceolate, about ⅛ inch long. Petals narrower and shorter than the sepals; the labellum turned upwards, lanceolate, acute, much shorter than the sepals, its base embracing the column. Flowers greenish-yellow.

Bog Orchis.

French, *Malaxis des marais.* German, *Sumpf Weichkraut.*

TRIBE V.—CYPRIPEDEÆ.

Anthers 2, lateral; the central stamen sterile and petaloid; pollen-masses not stalked, consisting of pulpy granules cohering but slightly.

GENUS XVIII.—**CYPRIPEDIUM.** *Linn.*

Perianth with the divisions spreading; labellum turned downwards, very large, concave, and shaped like a Turkish slipper or French *sabot*. Column short, incurved, 3-cleft; the central division petaloid, each of the lateral divisions bearing an anther. Pollen pulpy, granular.

Herbs with shortly creeping rootstocks with slender rootfibres. Stem with a few large parallel-nerved and plaited leaves sheathing at the base; rarely the leaves are radical. Flowers terminal and solitary or 2 or 3 in a spike, very large, and brightly coloured.

The name of this genus is derived from the Greek words *Κύπρις*, Venus, and *πόδιον*, a shoe or slipper, in allusion to the shape of the flowers of the species.

SPECIES I.—CYPRIPEDIUM CALCEOLUS. *Linn.*

PLATE MCCCCXC.

Reich. Ic. Fl. Germ. et Helv. Vol. XIII. Tab. CCCCXCVI.
Billot, Fl. Gall. et Germ. Exsicc. No. 2376.

Stem leafy. Upper sepal lanceolate; lateral sepals and petals strap-shaped; all of them maroon; labellum slightly compressed, shorter than the sepals and petals, pale yellow. Terminal lobe of the column nearly ovate, deflexed.

In woods on limestone. Very rare, and now nearly if not quite extinct. It formerly occurred in several stations in Yorkshire: it was found in Ouldray Gill, near Helmsley, by Mr. J. H. Phillips, as lately as 1849; it also used to occur in Helsotine Gill, about nine miles from Settle, and between Hawnby and Rievaulx; it was once plentiful in Castle Eden Dene, and was noticed there as lately as 1840. It is said to have been found in North Furness, Lancashire.

England. Perennial. Early Summer.

Rootstock creeping. Stem erect, 9 to 18 inches high, with leafless sheaths at the base, and several oval sheathing acute or acuminate leaves. Flowers 1, rarely 2. Sepals and petals 1½ to 1¾ inch long, dark maroon; labellum pale yellow, 1 to 1¼ inch long, by ⅝ to ¾ inch deep. Stem, veins of the leaves, pedicels, and ovary slightly puberulent.

Of this I have no British specimens, except a cultivated one brought from Castle Eden Dene by the late Rev. William Little.

Common Lady's Slipper.

French, *Sabot de la Vierge.* German, *Frauenschuh.*

Robert Brown described raphides in this order; and it is remarkable that no notice is given of these curious crystals in other plants by that illustrious botanist, judging from the collected edition of his works by the Ray Society. Mr. Gulliver has never failed to find raphides in our Orchidaceæ. Brown describes the raphides as smooth or rounded in their shafts; and this agrees with the subsequent observations of them in various orders of plants by Gulliver, who says that "the shaft of the raphis gradually vanishes or tapers to a point at both ends, and commonly presents no faces or angles." The numerous descriptions we have had of the prismatic form—distinct faces and angles—of raphides have arisen simply from confounding crystal prisms with raphides. But endless confusion will continue, unless we take care to distinguish raphides from crystal prisms and sphæraphides, as defined in Mr. Gulliver's paper, cited in page 19 of the present volume of this work.

We there, by an inadvertent expression, in the account of raphides, under *Lemna*, made it appear that Mr. Gulliver's discovery of the raphidian character in systematic botany was "since" the appearance of Dr. Lankester's "Notes on Raphides," in the "Quarterly Journal of Microscopical Science" for October 1863, whereas Dr. Lankester, in those "Notes," especially referred to Mr. Gulliver's researches on this subject, previously published in the "Annals of Natural History," and indeed to the writings on raphides of many other botanists.

ORDER LXXXI.—IRIDACEÆ.

Perennial herbs often with a tuberous, cormose or bulbous rhizome, or rarely with the rhizome reduced to a bud at the apex of slender radical fibres. Leaf-bearing stem frequently developed, simple or sparingly branched at the apex. Leaves entire, narrow, sheathing at the base, generally ensiform and equitant, sometimes flat or channelled and linear, sometimes tetragonal with parallel or cancellate venation, sometimes all radical; stem leaves alternate. Flowers perfect, regular or irregular, terminal or in spikes, fascicles, corymbs, or panicles, or rarely solitary, enclosed in herbaceous or more or less membranous spathes while in bud. Perianth with the tube herbaceous and adnate to the ovary, frequently prolonged beyond it and with the free portion more or less coloured; limb of six segments, separate or more or less united; the segments all alike or the three outer ones dissimilar, or the upper and lower ones dissimilar to those of the two lateral pairs, in which case those of each of the lateral pairs alike, but dissimilar to those of the other pair. Stamens 3, inserted on the top of the ovary or in the tube of the perianth, opposite to the outer perianth segments; filaments free or more or less monadelphous; anthers affixed by the base or by the middle of the back, extrorse, 2-celled; pollen granular. Ovary inferior, adnate to the tube of the perianth, rarely partially superior, usually trigonous or prismatic, rarely subglobose; ovules numerous in each cell, rarely few, inserted in the inner angle of the cell; style simple; stigmas 3, frequently petaloid; capsule dry, loculicidally 3-valved. Seeds numerous; testa membranous, coriaceous or fleshy; albumen plentiful, fleshy, cartilaginous or horny.

In this order crystal prisms occur abundantly. They are scattered through the plant-tissue, either singly or in twos or threes, and then appearing as if partly fused together; and they may be easily found at any time in the leaves of the very common and hardy *Iris Germanica*, almost always at hand in cottage and suburban gardens. These crystals are very distinct prisms, the faces and angles well marked, and each crystal usually larger than one of the true raphides. The crystal prisms are not only beautiful in themselves, but such capital objects for experiments with polarised light as to be well fitted to afford, in this way, many occasional and pleasant half-hours with the microscope. Certain common Liliaceæ also contain the crystal prisms plentifully. They occur often in the form of crosses in the bulb-scales of some onions, as the eschalot, but are smaller than in most Iridaceæ. These crystals are very easily examined in any of the plants mentioned.

GENUS I.—**SISYRINCHIUM.** *Linn.*

Perianth regular, petaloid; tube very short, either not extending beyond the ovary, or, if extending beyond it, straight; limb 6-partite, the segments all nearly similar, spreading or ascending. Stamens 3, inserted on the tube of the perianth; filaments united into a tube, or their bases cohering in a ring; anthers affixed by the base. Ovary adhering to the tube of the perianth, subglobular-trigonous, green; style short; stigmas 3, involute-filiform, entire. Capsule parchment-like, subglobular, bluntly trigonous, loculicidally 3-valved. Seeds numerous, subglobose or angulated, with a hard testa.

Herbs with roots consisting of tufts of wiry fibres, but with no conspicuous rootstock. Stems often 2-edged. Leaves commonly ensiform and equitant, rarely setaceous. Flowers rather small, brightly coloured, enclosed in bivalve subherbaceous spathes.

Σισυρίγχιον is a name given by Theophrastus to some bulbous plant.

SPECIES I.—**SISYRINCHIUM BERMUDIANA.** *Linn.*

PLATE MCCCCXCI.

S. anceps, *Bab.* Man. Brit. Bot. ed. vi. p. 336.

Stem winged, leafless, or of one or two leaves. Leaves narrow, grasslike. Perianth segments oblong-obovate, emarginate and mucronate, blue within, bluish-white on the exterior.

In boggy places. Very rare. In several places about Woodford, Galway, but possibly not native. In the "Cybele Hibernica," p. 291, the following stations are given: "In a low meadow on the bank of a stream called the Woodford River, four miles from Woodford, and one mile from Lough Derg, near the police barrack at Rossmore. In a piece of mountain pasture in the opening of a wood on a hill two miles north-east of Woodford, about 300 feet above the sea; also on the race-course in the village of Woodford; there is no garden near, and no probability of its having been cultivated in the neighbourhood (Mr. James Lynam). In a coarse meadow in the opening of the wood half a mile north of Woodford (Mr. James Lynam, in a letter addressed to Dr. Mackay, 1847). Mrs. Mathews, in a letter to the late Dr. Mackay, describes the plant as having been observed by her in two places more than a mile apart, in a wet ditch by the side of a mountain road adjoining a stony moor, and in another similar marshy place abounding with Narthecium, Anagallis tenella, Habenaria bifolia, Drosera rotundifolia, and other bog plants."

Ireland. Perennial. Summer.

Stems in tufts simple or forked, 6 to 15 inches high, in the Irish plant with wings about the breadth of the solid part. Leaves grass-like, equitant, shorter than the stems. Spathe of two lanceolate sharply folded acute valves of nearly equal length, shorter than the flower, but one of the valves sometimes longer than the fruit. Flowers 1 to 6, on slender pedicels. Perianth segments $\frac{3}{8}$ inch long, very delicate in texture, deep blue within, nearly white outside. Fruit about the size of a sweet-pea seed. Seeds dull black, subglobular, rough.

The Irish plant is the typical S. Bermudiana of Asa Gray's Manual. The variety anceps (S. anceps, *Cav.*), to which our plant is referred by Professor Babington, has broader leaves and much more broadly winged stems, and has the valves of the spathe very unequal, one of them much longer than the flowers.

The variety mucronatum (S. mucronatum, *Michx.*), to which Mr. Bentham says the Irish specimens are much nearer, has the leaves considerably narrower, and the stem is more slender and with very narrow wings. The spathe has the leaves unequal, and one of them longer than the flowers.

Blue Sisyrinchium.

GENUS II.—TRICHONEMA. *Kerr.*

Perianth regular, petaloid; tube scarcely extending beyond the ovary; limb 6-partite; segments all nearly similar, ascending-recurved. Stamens 3, erect, inserted in the throat of the tube of the perianth; filaments free, hairy; anthers affixed by the base. Ovary adhering to the tube of the perianth, short, ovoid-trigonous, coloured; style elongate, filiform; stigmas 3, linear, involute, bipartite. Capsule of the consistence of parchment, ovoid, bluntly 3-lobed, loculicidally

3-valved. Seeds numerous, obovate-subglobose, with a coriaceous testa.

Small herbs with oblique-based corms enclosed in a stout smooth chestnut envelope. Leaves mostly radical, linear, subtriquetrous, simple or branched. Flowers 1 or few, sessile, terminal, often lilac or purple, enclosed in a 2-valved herbaceous scape.

The name of this genus appears to be derived from the Greek words θρίξ (genitive τριχός), hair; and νῆμα, a filament.

SPECIES I.—**TRICHONEMA COLUMNÆ.** *Reich.*

PLATE MCCCCXCII.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLIV. Figs. 784 and 785.
Billot, Fl. Gall. et Germ. Exsicc. No. 1337.
T. Bulbocodium, *Sm.* Engl. Fl. Vol. I. p. 48. *Benth.* Handbk. Brit. Bot. ed. ii. p. 466.
Romulea Columnæ, *Seb. & Maur.* *Parl.* Fl. Ital. Vol. III. p. 253.
Ixia Bulbocodium, *Sm.* Engl. Bot. ed. i. No. 2549, Excl. Syn.

Leaves filiform, recurved, furrowed. Stem 1- rarely 2- or 3-flowered. Spathe longer than the tube of the perianth. Stamens about as long as the pistil. Stigmas 2-lobed.

On sandy commons. Very rare. Dawlish Warren, near Exmouth, Devon. "The exact spot is on the left of the old road from Exeter to Dawlish before ascending the hill to Mount Pleasant, and almost in front of the small cottages there; it extends at intervals to the ferry." (Mr. John Milford, in "Magazine of Natural History," vol. vii. p. 272.) Not uncommon in sandy districts in Jersey and Guernsey.

England. Perennial. Spring.

Corm about the size of a small pea, ovate-subglobular, oblique at the base as in Colchicum, but the bud in Trichonema is produced at the apex; coverings of the bulb leathery, smooth, chestnut, split at the apex. Leaves very slender, wiry; 1 to 4 inches long, cylindrical, slightly compressed, with a narrow furrow on the upper side. Stem when in flower 1 to 3 inches long, in fruit 3 to 6 inches. Outer valve of spathe about ¼ inch long, herbaceous, with numerous ribs; inner valve placed higher on the pedicel, its apex reaching as high as that of the outer valve, scarious, marked with elongate brown points. Flowers suberect or slightly inclined. Perianth segments ⅜ inch long, pale bluish-lilac with darker stripes, the outer ones tinged with green on the back, the throat pale yellow. Stamens shorter than the perianth segments; anthers yellow. Fruit pedicels elongate, curved. Capsule the size of a small pea. Seeds subglobose in a coriaceous chestnut testa.

The flower in the figure given in this work is considerably larger than it ought to be.

Columna's Trichonema.

French, *Romulée de Columna.*

GENUS III.—GLADIOLUS. *Tournef.*

Perianth irregular, petaloid, tube extending a little way above the ovary, and more or less curved; limb 6-partite, the segments unequal, disposed in a subbilabiate manner. Stamens 3, inserted in the tube of the perianth, subsecund, included or exserted; anthers linear, affixed by the back above the base. Ovary adhering to the base of the perianth tube, green, subglobular-ovoid, bluntly trigonous; style filiform, elongate; stigmas 3, obovate or oblanceolate, subpetaloid, undivided. Capsule of the consistence of parchment, ovoid or turbinate-ovoid, trigonous, loculicidally 3-valved. Seeds numerous, globular, compressed, and surrounded by a membranous wing, rarely globose with a soft testa and no wing.

Herbs with corms with a covering of netted or parallel fibres, and leafy stems with equitant and ensiform parallel-nerved leaves and showy spicate often secund ascending or horizontal flowers enclosed in 2- or 3-valved subherbaceous spathes. Rarely the leaves have their section in the form of a cross.

This genus derives its name from the diminutive of *gladius*, a sword, from the shape of its leaves.

SPECIES I.—GLADIOLUS ILLYRICUS. *Koch.*

PLATE MCCCCXCIII.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLII.

G. communis, *Hook. & Arn.* Brit. Fl. ed. viii. p. 441. *Benth.* Handb. Brit. Fl. ed. ii. p. 465 (non *Auct. Plur.*).

G. imbricatus, *Bab.* Ann. Nat. Hist. Ser. II. Vol. XX. p. 158 (non *Reich.*).

Corms ovate-ovoid, acuminate, clothed with subparallel fibres forming a network only towards the apex. Leaves linear-ensiform. Flowers secund. Spathe of two slightly unequal acuminated herbaceous halves with scarious margins much shorter than the flowers. Uppermost segment of the perianth oblanceolate-spathulate, arched, separate from the lateral ones in the lower half, but covered by their edges in the apical half; uppermost lateral segments oblanceolate towards the apex and linear-subparallel below. Stamens shorter than the filaments. Seeds with a membranous wing.

Amongst Pteris and in open places. Very rare. In several places in the New Forest about Lyndhurst, Hants. Isle of Wight (Mr. A. G. More). Sent to Mr. W. G. Smith, by Mrs. Gulson, from "Bitton Wood, near Teignmouth, Devon." (*Seem.* Journ. of Bot. 1865, p. 220.)

England. Perennial. Summer.

Flowering corm about the size of a hazel-nut, with numerous pale chestnut fibrous coats; the fibres loose and parallel below, but interlacing and forming meshes above, which, however, are by no means always elongate as is sometimes stated; bulbules at the base of the corm numerous, about as large as hemp seed. Stem 1 to 3 feet high. Leaves shorter than the spike, ¼ to ½ inch broad, tapering to an acute point, glaucous. Flowers 3 to 10, all turned one way. Perianth 1¼ to 1½ inch long, rich crimson-purple, the three lowest segments each with a purple line enclosing a paler spot at the apex. Anthers yellow, about ⅜ inch long. Stigmas oblanceolate, at first folded, afterwards flat. Capsule about ½ inch long, oblong-turbinate-trigonous, with three slightly elevated keels on the top. Seeds reddish-brown, with a wing scarcely so broad as the solid portion.

This no doubt is a sub-species of G. communis, differing principally from the typical form in its smaller size, more elongate corms, narrower leaves, fewer smaller and darker purple flowers with shorter and more acuminated spathes, shorter capsules and smaller seeds. The differences which are alleged to exist in the basal cusps of the anthers, and in the form of the divisions of the stigma, I am unable to perceive after cultivating the two sub-species side by side for six years; but G. Illyricus is always a little later in flowering than G. (eu)-communis.*

From my own observation of G. Illyricus growing in the New Forest, as well as from that of all the botanists who have seen it there, there can be no doubt that the plant is truly native in that locality. In the Isle of Wight, I believe but a single specimen was found.

Lesser Gladiolus.

French, *Glaïeul commun.* German, *Gemeine Siegwurz.*

The cultivated varieties of Gladiolus are among the most ornamental plants of our gardens, and are fast becoming the pets of the florist. Blooming in autumn, tall, handsome, richly coloured in great variety, and admirably adapted for planting in masses, they are in every way a necessity to the gardener, and of very easy culture.

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* In a paper written by me in the "Journal of Botany" for 1863, p. 134, I stated my belief that G. dubius, *Parl.* was simply a synonym of G. eu-communis. Since that paper was written, I have cultivated G. dubius, and find it flowers about three weeks earlier than G. (eu)-communis, and has the capsule considerably longer and oblong-fusiform, not oblong-turbinate as in the common plant, so that it must be considered as a distinct sub-species.—Ed.

GENUS IV.—IRIS. *Linn.*

Perianth regular, petaloid; tube extending beyond the ovary, short or elongate, straight; limb 6-partite, the three outer segments commonly larger and reflexed, or sometimes spreading; the three inner often ascending or incurved; all of them narrowed at the base. Stamens 3, inserted on the base of the outer segments of the perianth; filaments free; anthers affixed to the base. Ovary adhering to the tube of the perianth, green, trigonous-prismatic; style thick, rather short, trigonous, commonly adhering below to the tube of the perianth; stigmas (rather branches of the style) 3, petaloid, with a central midrib, one of the segments covering each of the stamens, their apex 2-lobed. Capsule subcoriaceous or parchmentlike, trigonous-hexagonal-prismatic or fusiform, with six more or less acute ribs, loculicidally 3-valved. Seeds numerous, flattish with a hard testa or globular with a hard or fleshy testa.

Herbs commonly with a creeping tuberous rhizome and ensiform and equitant leaves; or with corm or cormo-tuber and tetragonal leaves; or with a bulb and semicylindrical channelled or tetragonal leaves. Flowers large, brightly coloured, enclosed in herbaceous or more or less scarious imbricated spathes.

The name of this genus of plants is from Ἶρις, the messenger of the gods—the rainbow. The species of Iris are supposed to resemble the rainbow in their variety of colours.

SPECIES I.—IRIS FŒTIDISSIMA. *Linn.*

PLATE MCCCCXCIV.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCXLVII.
Billot, Fl. Gall. et Germ. Exsicc. No. 2929.
Xiphion fœtidissimum, *Parl.* Fl. Ital. Vol. III. p. 297.

Rhizome thick, horizontal, creeping. Stem slightly compressed, as long as or a little shorter than the leaves, simple. Leaves evergreen, broadly linear-ensiform, widest a little beyond the middle, subfalcate or nearly straight, deep green, slightly shining. Spathes terminal and lateral towards the extremity of the stem, herbaceous with narrow scarious borders. Flowers 2 or 3 from the terminal spathe, usually solitary from the lateral spathes. Pedicels longer than the ovary when the flower is expanded, about as long as the mature capsule. Free portion of the perianth tube oblong, shorter than the ovary. Sepals oblanceolate, the claw broad, folded into a gutter;

the lamina longer and little broader than the claw, oval, spreading or slightly recurved, not bearded. Petals spreading, about three-fourths the length of the sepals, and a little longer than the stigmas, elliptical-spathulate, with narrow parallel involute claws. Capsule 3-celled, oblong-fusiform, bluntly-trigonous, with six faint furrows. Seeds globose, with a smooth fleshy orange testa, which at last becomes dry, shrivelled, and dark red.

Var. *α*, *genuina.*

Lamina of the sepals pale purplish-blue, with purple lines. Petals lined with slaty blue.

Var. *β*, *citrina.*

Flowers wholly pale lemon-yellow, without purple lines.

In woods, by the borders of fields, on hedgebanks, and on rough slopes. Not uncommon, and generally distributed in the south of England, especially in chalky districts; rare in the north, extending to Anglesea, York and Durham. Not native in Scotland but naturalised at Ormiston, East Lothian, and near Dunfermline, Fife. Rare, and, though widely distributed in Ireland, probably introduced in many of its stations. The var. *β* has occurred in the Isle of Wight and in Dorset.

England, [Scotland,] Ireland. Perennial. Summer.

Rootstock branched, about the thickness of a man's finger, dull brown, with white flesh. Flowering stem produced from the apex of the branches of the rootstock, 1 to 2 feet high, usually with a barren tuft on each side of it. Leaves on the flowering stem shorter upwards, so that they scarcely overtop it. Flowers about 3 inches across. Claws of the sepals yellowish-white with a few purple veins; lamina pale purplish-blue (at least round the margins), prettily marked with numerous dark purple lines. Petals pale purplish-blue, or more or less tinged with lurid yellow, without darker lines. Stigmas lurid yellow. Capsule about 3 inches long, slightly drooping, the valves separating to the base and twisting, remaining through the winter with the berry-like seeds attached to the placentas which run down the middle of each valve. Plant when bruised giving out a strong odour, which has been compared to roast beef or boiled milk, but seems to me more like that of wet starch.

Fœtid Iris.

French, *Iris gigot.* German, *Schwertel.*

This plant is remarkable for its very peculiar scent, and has been employed in medicine as a powerful cathartic. It is very acrid and violent in its action, and not to be recommended. A common English name given to the plant is that of "the roast-beef plant," owing to the smell, which is said by the peasantry to resemble roast beef. Linnæus, when he gave the plant its present specific name, must have had a very different idea of its savoury odour.

SPECIES II.—IRIS PSEUD-ACORUS. *Linn.*

PLATE MCCCCXCV.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCXLIV.
Xiphion Pseud-acorus, *Parl.* Fl. Ital. Vol. III. p. 295.

Rhizome thick, horizontal, creeping. Stem slightly compressed, about as long as the leaves, sparingly branched or simple. Leaves decaying in winter, broadly linear-ensiform, nearly parallel, straight, glaucous green, dim. Spathes terminal and lateral at the extremity of the main stem, usually terminal only on the branches, herbaceous, with extremely narrow scarious borders. Flowers two or three together. Pedicels of the flower opening first in each spathe as long as or longer than the ovary; those of the other flowers shorter; all rather shorter than the mature capsule. Free portion of the perianth tube cylindrical, much shorter than the ovary. Sepals obovate-spathulate; the claw rather narrow; the lamina much longer and much broader than the claw, oval or suborbicular, reflexed, not bearded. Petals erect, from one-fourth to one-sixth the length of the sepals, and one-half to one-third that of the stigmas, oblanceolate or oblong-spathulate, with narrow subparallel claws. Capsule 3-celled, oblong-prismatic, bluntly trigonous, with six faint furrows. Seeds roundish-obdeltoid, much compressed, with parallel faces, and with a hard light brown slightly shining testa.

Var. α, *genuina.*

Iris Pseud-acorus, *Boreau*, Fl. du Centr. de la Fr. ed. iii. p. 635.

Sepals deep yellow, with an orange spot at the base of the oval lamina. Petals oblong, rather abruptly attenuated into the claw.

Var. β, *acoriformis.*

PLATE MCCCCXCV.

I. acoriformis, *Boreau*, Fl. du Centr. de la Fr. ed. iii. p. 635.

Sepals deep yellow, with an orange spot at the base of the suborbicular lamina. Petals smaller in proportion to the sepals and stigmas than in var. α, and with the lamina gradually attenuated into the claw.

Var. γ, *Bastardi.*

I. Bastardi, *Boreau*, Fl. du Contr. de la Fr. ed. iii. p. 635.

Sepals pale yellow, without an orange spot at the base of the oblong-oval lamina. Petals the size of those of var. β, but rather abruptly attenuated into the claw, as in var. α.

In ditches, marshes, and by the sides of rivers and ponds. Common, and universally distributed. I am unable to give the distribution of the varieties in Britain. Var. α I have not observed about London; but a plant which I brought to my garden from the marshes between Sandwich and Deal, on flowering proved to be I. Pseud-acorus of Boreau. Var. β is the only form I have seen by the Thames and its tributaries, and I have specimens of it also from Swanbister, Orkney, and Seton, Haddingtonshire. Var. γ appears to be rare, and I have never met with it myself; but I have seen a specimen from Lord Mansfield's fish-ponds, near Highgate; it is said to have occurred in Cambridgeshire; and was also found in Ayrshire by Mr. James Smith, of Ayr.

England, Scotland, Ireland. Perennial. Summer.

Rootstock as thick as a man's finger or thicker, dark brown, the flesh tinged with red, especially after it has been cut for a short time. Flowering stem 2 to 4 feet high, commonly with branches from the axils of the upper leaves. Spathe with acute valves, which are nearly wholly herbaceous. Flowers 3 to 4 inches across, the sepals usually with purple lines on the claw, which diverge in a small rhomboidal-oblong space at the base of the lamina: in vars. α and β this rhomboidal space is of an orange-yellow, and the rest of the lamina bright yellow; but in var. γ this space is of the same pale yellow colour as the rest of the lamina of the sepal. Petals and stigmas pale yellow. Anthers purplish-brown. Capsule about 3 inches long, at length pendulous, the valves ultimately separating at the apex, rolling back and scattering the seeds. Seeds about ¼ inch across, appearing as if they were flattened by the mutual pressure, so that they stand in double rows in each cell like rouleaux of coin; testa dry as soon as the seed is ripe.

I can find no sufficiently distinctive characters to separate the three species which Boreau includes under the Linnean I. Pseud-acorus.

Yellow Water Iris.

French, *Iris faux-acore.* German, *Wasser Schwertel.*

Everyone must have observed the bright yellow flowers of this pretty plant, enlivening the banks of our rivers and reedy ditches in June and July. It is supposed to have furnished the heralds with the device called the "fleur-de-lys," the national bearings of France adopted, according to tradition, by Louis VII., and deriving its name from the river Lys, on the borders of Flanders, on the banks of which it is particularly abundant. It was at one time considered as peculiarly sacred to the Virgin Mary, as shown in the legend of the old knight, who, more devout than learned, became a monk, but could never retain in his memory more than two words of a prayer to the Virgin. These were "Ave Maria," and with these he constantly addressed his prayer to heaven. Night and day his prayer continued, until the good old knight died, and was laid in the chapel-yard of the convent, when, as a proof of the acceptance of his brief but earnest prayer, there sprang up a plant of fleur-de-lys, which displayed in every flower the words "Ave Maria" shining as golden letters. The sight induced the monks, who had despised him during his lifetime on account of his ignorance, to open his grave; and there they found the root of the plant resting upon the lips of the good old soldier who lay mouldering there.

Writers who have thought and made research on the subject of the origin of the fleur-de-lys as an emblem in the arms of France, conclude that it was a conventional symbol long before it was thus adopted, that it was employed as an ornament in that country two centuries before the reign of Louis IX., and that it is rather the triple leaf which, being anciently used in heraldry, suggested the form of the fleur-de-lys. It is still a question whether the form was intended to represent the flower, or a halbert's head, or, as some say, a toad.

The flower was called, according to Philinus, "the wolf," from its supposed resemblance to the lips of that animal; and some made it the symbol of a messenger, on account of its name of Iris. It was held in the highest esteem in medicine, curing coughs, bruises, "evil spleens," convulsions, dropsies, and serpents' bites, and as Gerarde says, "doth mightilie and vehementlie draw forth choler." It was even employed as a cosmetic, and still finds favour with our rustic maidens for this purpose. But it must be used with caution, as Gerarde thus refers to its powers: "Clene washed and stamped with a few drops of rosewater, and laid plaisterwise upon the face of man or woman, it doth in two daies at most take awaie the blacknesse and blewnesse of any stroke or bruse, so that if the skinne of the same woman, or any other person, be very tender and delicate, it shall be needful that ye laye a piece of silk, sendalle, or a piece of fine laune, between the plaistre and the skinne, for otherwise in such tender bodies it often causeth hete and inflammation."

The Romans called the plant *consecratrix*, from its being used in purifications, and Pliny mentions certain ceremonies in digging up the plant, which are very similar to those described by him and by Theophrastus in other cases. The juice of the plant has been employed to produce sneezing, and so relieve headache, and a slice of the root held in the mouth is said to relieve toothache. It is singular that its acrid qualities are entirely dissipated by drying, after which it acts only as an astringent. With sulphate of iron it yields a black dye. The angular seeds, when ripe, form a good substitute for coffee, but must be well roasted before using. The dried rhizome of one species of Iris growing in southern countries is known by the name of "orris root," and is a frequent ingredient in toothpowder.

SPECIES III.—**IRIS TUBEROSA.** *Linn.*

Plate MCCCCXCVI.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCXLVIII.
Hermodactylus tuberosus, *Salisb.* *Gren. & Godr.* Fl. de Fr. Vol. III. p. 245. *Parl.* Fl. Ital. Vol. III. p. 318.

Rhizome an oblong-cylindrical horizontal cormo-tuber, the old tuber perishing after flowering. Stem cylindrical, shorter than the leaves, simple. Leaves appearing in winter and dying off in early summer, very long, slender, sharply quadrangular, tapering to the point, dull glaucous green, dim. Spathe terminal, elongate, acuminate, herbaceous, with an extremely narrow scarious margin. Flowers solitary. Pedicel much longer than the ovary when the flower is expanded. Free portion of the perianth tube narrowly cylindrical, shorter than the ovary. Sepals oblong-oblanceolate, the claw broad, slightly folded, erect, constricted where it is joined to the lamina; lamina much shorter and scarcely broader than the claw, oval, notched at the apex, sharply reflexed, not bearded. Petals about one-third the length of the sepals, and half the length of the stigmas, erect, lanceolate-spathulate, acuminated into a very slender point. Capsule 1-celled, oblong-fusiform, bluntly trigonous, with six furrows. Seeds subglobular, when dry with a hard fuscous reticulated testa and a small whitish strophiole at the hilum.

In orchards and hedgebanks. Not native, but said to be naturalised in Cornwall and South Devon. The specimen figured in "English Botany Suppl." was sent by the Rev. Henry Pennick from Penzance, who found the plant in considerable plenty in several places four or five miles apart in that neighbourhood: Mr. F. P. Pascoe assured me it was quite naturalised in that part of Cornwall; and Mr. T. B. Flower has specimens from Kingsbridge, S. Devon, obtained by him in 18[illegible]0, when the plant was in some abundance there. It is reported from Cork; but in the "Flora of Cork" it is said to be not even naturalised there.

[England, Ireland?] Perennial. Spring.

Rootstock a cormo-tuber about the thickness of a man's finger, 1½ to 3 inches long, frequently dividing from the base into two or three branches, from the extremity of each of which a stem or tuft of leaves is sent up: close to the apical bud lateral buds are produced, and in autumn the parent tuber dies away, setting free the tubers produced from these buds either separately or connected together at the base. Flowering stem 9 inches to 1 foot high, sheathed at the base, and producing from the axils of the sheaths several very long tetragonal leaves sheathing at the base, and about twice as long as the flowering stem. Spathe longer than the pedicels, and frequently exceeding the flower. Flowers 1½ to 2 inches across, remarkable for the claws of the sepals being connivent, and nearly erect. Claw of the sepals pale green, yellowish on the back, with a few dark veins; lamina dull lurid blue, almost black. Petals greenish-white. Stigmas nearly erect, with the lobes acuminate. Seeds rather larger than sweet-pea seeds; but I have only seen them in a dried condition.

I have seen no British specimens of the plant, but have described it from cultivated specimens grown from a root which was sent me by M. Lenormand from the south of France.

Tuberous Iris.

French, *Iris tubéreux.*

GENUS V.—**CROCUS.** *Tournef.*

Perianth regular, petaloid; tube very long, straight, and extending much beyond the ovary; limb 6-partite; segments all nearly similar, incurved or recurved. Stamens 3, inserted on the base of the external segments of the perianth; filaments filiform; anthers affixed by the base. Ovary adhering to the base of the perianth tube, ovoid, bluntly trigonous, white; style very long, filiform; stigmas 3, wedgeshaped, fleshy, denticulate or cut at the apex. Capsule of the consistence of parchment, fusiform-trigonous, loculicidally 3-valved. Seeds few, globose, with a somewhat fleshy testa.

Herbs with equal-based corms covered by an envelope of parallel or interlacing fibres or more rarely splitting into transverse rings. Leaves all radical, linear, often revolute, channelled above, keeled beneath, with a white stripe on the upper side. Flowers large, showy, enclosed in a convolute membranous spathe; the ovary remaining underground till after the time of flowering.

The derivation of the name of this genus of plants is from the Greek words *κρόκος* or *κρόκον*, saffron; or *κρόκη*, the thread called woof or weft in weaving, because the stigmata are like threads for ornamental weaving.

SPECIES I.—**CROCUS BIFLORUS.** *Miller.*

PLATE MCCCCXCVII.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLVI. Fig. 788.
Billot, Fl. Gall. et Germ. Exsicc. No. 2373.
C. minimus, *Hook. & Arn.* Brit. Fl. ed. viii. p. 442 (non *D.C.*).
C. præcox, *Haworth*, in Engl. Bot. Suppl. No. 2645.
C. reticulatus, *Sm.* Engl. Fl. Vol. IV. p. 262 (non *M. Bieb.*).

Corm not stoloniferous, clothed with thick shining leathery coats which split transversely into rings towards the base, and under pressure separate into triangular plates at the apex, but have no fibrous structure. Leaves produced at the end of winter before the flowers, very narrowly linear, with parallel sides and strongly revolute margins. Spathe 2-valved; the valves subequal, acute, scarious. Flowers 1 to 3 (usually 2), appearing in early spring. Perianth segments when closed fusiform-cylindrical, about half the length of the tube, the throat yellow, glabrous. Stigma overtopping the stamens, deeply 3-cleft, with the divisions narrowly wedgeshaped, channelled, truncate, slightly notched and faintly crenate at the apex.

Naturalised on the site of an old garden in Barton Park, Bury St. Edmunds, Suffolk. In this station it has maintained its ground for more than half a century.

[England.] Perennial. Early Spring.

Corm flowering when a little larger than a marrow-pea, remarkable for the structure of its coats, which are almost crustaceous in texture, pale yellow with a brown bloom; these coats split transversely, leaving a ring at the base; they show no indication of the fibrous texture which is common in the tunics of the corms of this genus. Leaves appearing very early in the year, dark green with a narrow white line down the centre. Perianth tube extending 1 to 1½ inch above the spathe; perianth segments 1 to 1¼ inch long, narrowly elliptical, subacute, white tinged with pale lilac, especially inside, the outer ones with about three dark purplish stripes, the base tinged with yellow. Anthers yellow, longer than the filaments. Stigma yellowish-orange, the segments erect. Capsule about ½ inch long or a little more. Seeds about the size of sago grains, with a pale red spongy testa.

For fresh specimens of this and the next species I am indebted to Sir Charles Bunbury, the present owner of Barton Park. These specimens are much smaller in all their parts than the "Scotch Crocus" (which is the usual garden form of C. biflorus), and have the closed perianth more cylindrical, more tinged with lilac, and with the lines of a clearer purple. In other respects the Barton Park plant is similar to the garden form.

Scotch Crocus.

SPECIES II.—CROCUS AUREUS.

PLATE MCCCCXCVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLVII. Fig. 792.

Corm not stoloniferous, clothed with rather thick somewhat leathery coats, not splitting transversely, but marked with and ultimately splitting at the base into broad longitudinal flattened fibres. Leaves produced in early spring with the flowers, very narrowly linear, with parallel sides and strongly revolute margins. Spathe 1-valved, obliquely acute, scarious. Flowers 1 to 4, usually 2 or 3, appearing in spring. Perianth segments when closed oblanceolate-fusiform, not half the length of the tube, the throat yellow, glabrous. Stamens about half the length of the perianth segments. Stigma much shorter than the stamens, deeply 3-cleft, with the divisions narrowly wedge-shaped, channelled, truncate, slightly notched and indistinctly crenate at the apex.

Naturalised in Barton Park, Bury St. Edmunds, Suffolk, where it grows in company with Crocus biflorus, Ornithogalum nutans, and Muscari racemosum.

[England.] Perennial. Spring.

Corm flowering when about the size of a black currant, clothed with numerous coats, which divide into broad flattened fibres, and are continued upwards, forming chocolate-coloured sheaths surrounding the leaves and stem. Leaves appearing with the young flowers, and very short till these have faded, a little broader than those of C. biflorus, dark green with a narrow white central line. Perianth tube extending 1 to 1½ inch above the spathe: perianth segments 1 to 1¼ inch long, broadly oblanceolate-elliptical, subacute, rich orange-yellow. Anthers yellow, much longer than the filaments; stigma yellowish-orange, with the segments erect. Capsule ¾ inch long. Seeds pale red, about the size of rape seed.

This differs from the Yellow Crocus of the gardens (C. luteus, *Lam.*) in the thicker coats of the corm, the narrower leaves, the smaller and more orange flowers, the segments of which when closed are less constricted a little above the base, and less swollen beyond the middle, and have no greenish lines at the base.

Golden Crocus.

The Crocus was formerly much cultivated in Britain for the sake of its orange-coloured stigmas, which are the saffron of commerce and medicine. Saffron had at one time a great reputation as a cordial and aromatic medicine. It is mentioned by the earliest Greek writers, and was well known to the Romans, who used it not only in medicine and cookery, but as a cosmetic. The ladies of Italy, envying the blond locks of more northern nations, introduced the custom of dyeing their hair with saffron, a practice which called down upon them the anathemas of some of the early Fathers of the Church; and Tertullian, Cyprian, and Jerome agree in declaring that the hue thus attained was neither more nor less than a "presage of the fires of hell." Little less seems to have been the prejudice excited by the use of saffron as a dye even for linen, when Ireland fell under the English yoke. The subject became one of severe legislation, as well as of bitter reproach. A statute in the reign of Henry VIII. forbids the Irish, under penalty, from wearing any "shirt, smock, kercher, bendel, neckercher, mocket, or linen cap, dyed with saffron." Sir Henry Ellis suggests that the dye was adopted for its ornamental colour, but that seems scarcely probable, when many less expensive dyes would yield the same colour. Most contemporary writers attribute the custom to a belief that it was good for the health, "mitigating the effects of their humid climate." Christopher Calton, in 1591, says, "The saffron hath power to quicken the spirits; and the virtue thereof pierceth by and by to the heart, provoking laughter and merriment, and they say that those properties come by the influence of the sun, unto whom it is subject, from whom she is ayded, by his subtile nature, bright and sweete smelling." Hill, in his "Herbal," declares that "the whole compass of medicine does not afford a nobler cordial or sudorifick;" and Gerarde says that, though it causes headache and hurts the brain if taken in large quantities, its moderate use is good for the head, maketh the senses more quick and lively, merry and less sleepy, strengthening the heart and lungs, and being "especial good" for consumption, "even if the patient be at death's door." For yellow jaundice he commends it according to the doctrine of signatures, and for "plasters to sores," adding that it is much used in illuminating and other painting. It is now very little used in medicine, except as a colouring matter for mixtures and powders.

Among the ancients in the west, as well as in the east, the Crocus was highly prized, whether in its fresh state for strewing the floors of apartments, or as saffron for twenty different purposes. Homer mentions it with the lotus and hyacinth; Pliny devotes a chapter to its treatment and propagation; and Horace particularises the "Corycian saffron," which was esteemed the best in the world. The Romans applied the essential oil to the skin as a cosmetic, as well as to the hair, and largely used it for the purpose of scenting and refreshing theatres and other places of assembly. For this purpose it was powdered and steeped in water or wine; the liquid was then shot, by means of a kind of syringe with extremely fine pores, over the whole multitude, so that it fell in drops so fine as to resemble an almost impalpable dust. In the tales of the "Arabian Nights," saffron cakes abound even more plentifully than they did in former days in the hospitalities of our English housewives. The monopoly of all saffron grown in the district is still retained by the Rajah of Cashmere, and the cultivators are compelled to sell it to him at a stated price; the whole crop being compulsorily carried to the town of Cashmere before the prized stigmas are extracted. Hakluyt states that the cultivation of saffron was introduced into England in the reign of Edward III. by a pilgrim, who, being a native of Walden in Essex, brought a bulb of the precious Crocus to his native place. This was done "with venture of his life, for if he had been taken, by the law of the country from whence he came he had died for the fact." In order to bestow this benefit on his native district, he had hollowed out his palmer's staff so as to conceal within it the precious plant. From this circumstance the name Saffron Walden seems to have originated, and it is singular that saffron is grown in that district to the exclusion of almost all others in England. During Lent saffron was at one time largely used in cookery, it is said for the purpose of keeping up the "animal spirits," which long-continued fasting considerably affected. Camden, when writing of Saffron Walden, says that the fields under saffron cultivation look "very pleasant," and, "what is more to be admired, that the ground which hath bore saffron three years together, will bear barley very plentifully eighteen years without dunging, and afterwards be fit eno' for saffron."

The "Roman Catholic Flora," in mentioning the particular flower to be laid at the shrine of every saint according to the season of the year, says that

"The Crocus blows before the shrine
At vernal dawn of St. Valentine."

Hence it is often called "Flower of St. Valentine," or "Hymen's torch," a name prettily appropriate to the flaming glow of the golden yellow Crocus, which, according to Roman mythology, was once a youth pining to death for his love, and was metamorphosed into a Crocus. According to others, it first sprang from some drops of magic liquor which Medea prepared to restore the aged Æson to the strength and vigour of youth.

The eastern name of the Crocus is still "Zahfaran," of which our word saffron seems to be a corruption.

The quantity of saffron grown in England is now but small. In Cambridgeshire and Essex there are crops occasionally to be seen. The flowers are gathered in the morning, when they are quite open, and the stigmas picked out and dried between papers in a kiln. It was formerly made into cakes, and dried under pressure, but this plan is rarely followed, and what is sold as cake saffron is really composed of safflower. Large quantities are imported from France and Spain.

SPECIES III.—CROCUS VERNUS. *All.*

PLATE MCCCCXCIX.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLV.
Billot, Fl. Gall. et Germ. Exsicc. No. 1335.

Corm not stoloniferous, clothed with thin membranous coats not splitting transversely, but containing numerous slender anastomosing capillary fibres. Leaves produced in spring with the flowers, broadly linear, widest in the middle and tapering towards the end, with slightly revolute margins. Spathe 1-valved, scarious, obliquely obtuse. Flowers 1 or 2, appearing in spring. Perianth segments when closed oblanceolate-ovoid, much shorter than the tube; the throat purple or white, with a circle of hairs between the bases of the stamens. Stamens two-thirds the length of the perianth segments. Stigma equalling the stamens, deeply 3-cleft, with the divisions wedge-shaped-obdeltoid, channelled, truncate and deeply crenate at the apex.

Completely naturalised in meadows in several places in England. Very abundant in Nottingham Meadows, where it has been long known to occur; also at Mendham on the confines of Norfolk and Suffolk, and at Hornsey, Middlesex. In many other places it has been noticed, but only as the outcast of gardens. In Ireland it is plentiful near the Old Castle, Dunganstown, Wicklow.

England, Ireland. Perennial. Spring.

Corm more depressed than in the two preceding, flowering when about the diameter of a fourpenny piece, clothed with brown coats which are remarkable for their slender reticulated fibres. Sheaths at the base of the stem scarious. Leaves short at the time of flowering, lengthening afterwards, and ultimately attaining the breadth of $\frac{1}{4}$ to $\frac{3}{8}$ inch in the middle, with a rather broad white line down the centre. Perianth segments $1\frac{1}{2}$ to 2 inches long, rather pale purple, darker towards the base, varying to white. Anthers bright yellow. Stigmas orange, much broader and more distinctly crenate than in the two preceding species. Capsule about $\frac{3}{4}$ inch long. Seeds pale red, about the size of white mustard seed.

Mr. Whittaker has sent me living roots of this species from Nottingham Meadows, and also of C. nudiflorus; these I have cultivated for four or five years: the Nottingham C. vernus is identical with the purple Crocus of the gardens, a form not native in the north of Europe.

Purple Crocus.

French, *Safran printanier.* German, *Frühlings Safran.*

SPECIES IV.—CROCUS NUDIFLORUS. *Sm.*

PLATE MD.

Billot, Fl. Gall. et Germ. Exsicc. No. 1336.
C. speciosus, *Wils.* Engl. Bot. Suppl. No. 3752 (non *M. Bieb.*).
C. multifidus, *Lam.* *D. C.* Fl. Fr. Vol. III. p. 242.

Corm stoloniferous, clothed with thin membranous coats not splitting transversely but containing numerous filiform parallel fibres. Leaves produced in early spring before the fruit, very narrowly linear, with subparallel sides and revolute edges. Spathe 1-valved, obliquely obtuse. Flowers solitary, appearing in autumn when no leaves are present. Perianth segments when closed oblong-fusiform, much shorter than the tube; the throat purple, glabrous. Stamens about three-fourths the length of the perianth segments. Stigma longer than the stamens, deeply 3-cleft, the segments broadly wedgeshaped, cut into slender linear filaments.

Naturalised in meadows abundantly at Nottingham, Derby, and Warrington.

England. Perennial. Autumn.

Corm flowering when the size of a small pea, sending out in spring stolons which are thickened at the extremity; this thickened extremity, by the decay of the basal part of the stolon, is set free in the form of a subcylindrical corm, a little thickened towards the apex, and the next season assumes the depressed subglobular form of the parent corm. Leaves appearing at the end of winter from the minute corm formed at the apex of the old corm, very slender, with a narrow white line down the centre. Flowers with the perianth tube 3 to 10 inches long, clothed with several sheaths below the spathe. Perianth segments 1½ to 2 inches long, pale bright purple, less inclining to blue than those of C. vernus. Anthers bright yellow. Stigmas reddish-orange, sometimes only a little higher than the anthers, at other times extending considerably beyond them, remarkable for the fine divisions into which they are cut. Capsule rarely perfected (at least in the cultivated plant), about ½ inch long, the seeds similar to those of C. vernus.

Naked-flowering Crocus.

EXCLUDED SPECIES.

GLADIOLUS EU-COMMUNIS.

G. communis, *Koch* et *Auct. Plur.*

Said to be naturalised in a field near Churchgate Street, Harlow, Essex. (Mr. Daniel Sweeting French, in "Flora of Essex," p. 313.)

IRIS PUMILA. *Linn.*

Said to occur in Chartley Meadows, Leicestershire. ("Phytologist," ser. i. vol. iii. p. 179.)

IRIS GERMANICA. *Linn.*

Reported to occur in Staffordshire about a ditch in Stoke Meadows, introduced. (Garner's "Nat. Hist. of Staffordshire," quoted in Cyb. Brit. vol. ii. p. 441.)

IRIS SUSIANA. *Willd.*

Reported to having occurred, but I cannot ascertain where.

IRIS XIPHIOIDES. *Ehrh.*

Said to have grown in Glamorganshire at Gelly Evan, near Penllergare, "Dillwyn's Mat. for a Fauna and Flora of Swansea," quoted in Cyb. Brit. vol. ii. p. 440, where it is also mentioned that Mr. George Don asserted that he discovered it in the year 1810 in a marsh near Colonel Kinloch's, growing among Carices and Junci, in a situation where it had never been cultivated.

IRIS XIPHIUM. *Ehrh.*

Stated in the old "Botanist's Guide" to grow in Worcestershire; but in the new "Botanist's Guide," p. 205, it is stated, "the introduction of this as a Worcestershire plant is said to be an error."

CROCUS SATIVUS. *Linn.*

S. autumnalis, *Sm.* Engl. Bot. No. 343 (non *Poir.*).

Said to have occurred in various places in the east of England, but there is no evidence to show that it was ever even naturalised. It used to be cultivated for saffron at Saffron Walden, Essex, and Hinton, Cambridgeshire; but the cultivation has been abandoned for about seventy years.

ORDER LXXXII.—AMARYLLIDACEÆ.

Perennial herbs, not scurfy or woolly, with the leaves all radical and with radical scapes, or rarely in a few exotic species with a perennial leafy stem. Rootstock generally a tunicated bulb, more rarely creeping. Leaves simple, entire, sheathing at the base, generally linear-lorate, parallel-veined. Flowers perfect, solitary or umbellate, on a leafless scape, rarely spicate, racemose or paniculate. Perianth regular, or rarely irregular, with a tube united to the ovary and often produced above it; limb of 6 leaves, free or slightly united, usually all similar and petaloid, sometimes with a crown within it either free from the stamens and exterior to them, or combined with the stamens, in which case it is sometimes 6-partite or of six separate lobes. Stamens 6, very rarely 12 or 18, inserted on an epigynous disk, or in the tube of the perianth and opposite its lobes; anthers 2-celled, affixed by the base or the middle of the back, introrse, opening longitudinally or at the apex. Ovary inferior, united with the perianth tube or with its base, 3-celled, rarely only imperfectly so: ovules numerous or definite, inserted in the inner angle of the cells or (in the 1-celled ovary) on parietal placentæ, anatropous or semianatropous; style single; stigma undivided or 3-lobed, rarely 3-cleft. Fruit generally capsular, rarely berry-like, loculicidally 3-valved or more rarely indehiscent. Seeds with the testa of various consistence: albumen fleshy or horny; embryo straight or nearly so, the radicle pointing towards the hilum, or very rarely away from it.

TRIBE I.—NARCISSEÆ.

Perianth with a crown or petaloid tube in the throat; crown free or adhering to the stamens.

GENUS I.—**NARCISSUS.** *Linn.*

Perianth coloured, petaloid, regular; tube prolonged beyond the ovary, the free portion cylindrical, straight; limb of 6 ovate or oblong or lanceolate segments, which are free to the base, all similar, spreading or ascending, the three inner as long as the outer, but usually narrower. Crown monophyllous, cylindrical or funnelshaped or saucershaped or rotate, usually crenate at the margin, as long as or shorter than the segments. Stamens 6, inserted in two rows in the perianth tube below the crown and wholly within it; filaments free or adnate to the perianth tube, but not to the crown; anthers affixed by the back a little above the base on the inner side, opening by longitudinal slits. Ovary adhering to the tube of the perianth, green, elliptical-ovoid, trigonous; style elongate-filiform; stigma obtuse, undivided. Capsule obovate-ovoid, subherbaceous, loculicidally 3-valved. Seeds rather few, subglobose, with a smooth testa, which becomes rough when they are dried.

Herbs with tunicated bulbs and radical linear-lorate, or linear and channelled or semicylindrical green or glaucous leaves, which are often slightly twisted. Scapes generally ancipitate, terminated by a membranous spathe, enclosing several umbellate horizontal or ascending or drooping flowers, or a single horizontal or drooping or pendulous or rarely erect flower. Flowers large, white or yellow, or white with a yellow crown, the latter sometimes with a red margin.

The name of this genus has a mythological origin, and was so called after the self-enamoured youth Narcissus, who was changed into this flower.

SECTION I.—AJAX. *Haworth.*

Spathe 1-flowered. Flower shortly pedicellate. Free portion of the perianth tube funnelshaped; perianth segments broad. Crown tubular, as long as or a little longer than the perianth segments. Stamens and style straight, the former inserted at the base of the perianth tube, and free from it.

SPECIES I.—**NARCISSUS PSEUDO-NARCISSUS.** *Linn.*

PLATE MDI.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLXIX. Fig. 816.
Billot, Fl. Gall. et Germ. Exsicc. No. 468.
Ajax Pseudo-narcissus, *Haworth. Kunth*, Enum. Pl. Vol. V. p. 708. *Parl.* Fl. Ital. Vol. III. p. 107.

Leaves linear-lorate, scarcely tapering towards the apex, nearly flat, more or less glaucous. Scape about as long as the leaves when in flower. Flower solitary, inclined or horizontal. Pedicel shorter than the ovary. Perianth segments ascending-spreading, oblong-ovate or -lanceolate, subacute, a little longer than the free portion of the perianth-tube, which is cylindrical-funnelshaped. Crown tubular-cylindrical or slightly trumpet-mouthed, very slightly plaited towards the apex; the margin continuous or 6-cleft or 6-lobed and crenate-serrate.

Var. *α*, *genuinus*.

Plate MDI.

Leaves slightly glaucous. Perianth segments oblong-lanceolate, pale yellow. Crown bright yellow, crenate-serrate and usually cut into six shallow nearly rectangular segments at the apex.

Var. *β*, *Bromfieldii*.

N. Pseudo-narcissus var. γ, concolor. *Bromf.* Fl. Vect. p. 407.
Ajax lobularis, *Haworth* in Phil. Mag. Aug. 1830, p. 131 (ex loc. nat., non ex descript.).

Leaves very glaucous. Perianth segments ovate or oblong-ovate, bright yellow, nearly as dark as the crown. Crown crenate and cut into six rounded lobes at the apex. Flowers expanding earlier than those of var. *α*, and the scape generally shorter.

In woods, meadows, pastures, and on banks. Not uncommon in the south of England, where it appears to be truly native; but how far north it is impossible to ascertain. In Scotland it is only an introduced plant. In Ireland it may be native in some of its stations, but is considered by the authors of the "Cybele Hibernica," as not a true native. Var. *β* very doubtfully native. The late Rev. W. T. Bree sent me living specimens from his garden, the roots of which originally were gathered by a friend of his at Tenby, Pembrokeshire. Dr. Bromfield mentions its occurrence on a steep bushy bank behind Apse Farm (Isle of Wight), overlooking the garden, in which it also grows plentifully, "though appearing rather to have encroached on the grass plots from the station above than to have escaped there from the former" (Fl. Vect. p. 498). Mr. Frederick Stratton has visited this station, and reports that the garden appears formerly to have extended up the bank, and he does not believe the Narcissus is indigenous there.

England, [Scotland, Ireland]. Perennial. Spring.

Rootstock flowering when about the size of a nutmeg, with a thin smooth pale-brown covering, the coats continued upwards into a few scarious sheaths enclosing the leaves and scape. Leaves 2 or 3, $\frac{3}{8}$ to $\frac{1}{2}$ inch broad, appearing towards the end of winter. Scape 6 inches to 1 foot high, when in flower 2-edged, erect, and furrowed, slightly inclined. Spathe at first subherbaceous, but scarious before the flowers expand. Buds at first erect, afterwards drooping, the flower inclined or nearly horizontal. Perianth tube about $\frac{3}{4}$ inch long, yellow tinged with green; perianth segments about 1 inch long, subacute, primrose-yellow. Crown golden yellow, 1 to 1¼ inch long, usually with the mouth straight, or very slightly turned outwards, rather deeply crenate-serrate, and often with 6 shallow incisions, which divide it into 6 segments, which, however, as their edges are usually contiguous, are not conspicuous on a superficial examination. Stamens and style much shorter than the crown, the style slightly exceeding the stamens. Capsule about ¾ inch long, inclined, oblong-turbinate, containing numerous seeds about the size of white mustard seed; when fresh these seeds are smooth, polished, and shining, but when dry the testa becomes rugose.

Var. β is perhaps a sub-species, but has small claims to be considered a native plant. The late Rev. W. T. Bree assured me it was the form on which Haworth founded his Ajax lobularis; but Haworth's description applies to Narcissus major. The var. β is sold by London seedsmen as N. nanus or N. nanus major.

Var. α is rarely seen in gardens. The cultivated Daffodil is N. major (*Curt.*), which is larger, with the flowers deep yellow, the free portion of the perianth tube only half the length of the segments, and the crown much more trumpet-mouthed.

Common Daffodil.

French, *Narcisse faux-Narcisse.* German, *Gemeine Narcisse.*

Our present species, Daffodil, has simply the old English name *affo dyle*, which signified "that which cometh early," and it was long before the word was corrupted into *daffodil*. It is one of our earliest spring flowers; it is rare in Scotland and Ireland, but in the south-west of England its pale yellow blossoms may be seen covering acres of land. In Cornwall they are still called "Lent lilies." The root, and to some extent the whole plant, is poisonous; yet a useful spirit has been distilled from it, which is sometimes used as an embrocation, and is also given as a medicine. Most welcome are these pretty spring flowers to us all; and in cottage gardens they add beauty and grace without expense or trouble, for they grow under almost any conditions.

"When the vales are decked with Daffodils,
I hail the new reviving year,
And soothing hope my bosom fills."

Herrick, in his "Hesperides," laments their departure in a more serious strain—

"Fair Daffodils, we weep to see
You haste away so soon;
As yet the early rising sun
Hath not attained his noon.
We have short time to stay as you;
We have as short a spring,
As quick a growth to meet decay,
As you or any thing.
We die
As your hours do, and dry
Away,
Like to the summer rain,
Or as the pearls of morning dew,

We often hear the Daffodil called "Daffadowndilly" and "Daffodilly;" and the origin of the name is probably never regarded. It is possibly confused with the saffron lily, by older writers called "sapharoun lily."

SECTION II.—QUELTIA. *Parl.*

Spathe 1- or few-flowered; flower rather longly pedicellate. Perianth tube above the ovary, cylindrical, slightly enlarged upwards; perianth segments broad. Crown widely funnelshaped or cylindrical-funnelshaped, about half the length of the perianth segments. Stamens and style straight, the former adnate to the perianth tube half-way up.

SPECIES II.—**NARCISSUS INCOMPARABILIS.** *Miller.*

PLATE MDII.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLXX. Fig. 819.
Queltia incomparabilis, *Haworth; Parl.* Fl. Ital. Vol. III. p. 111.
Q. fœtida, *Herb. Kunth,* Enum. Pl. Vol. V. p. 723.

Leaves linear-lorate, scarcely tapering towards the apex, nearly flat, slightly glaucous. Scape a little longer than the leaves when in flower. Flower solitary, inclined or horizontal. Pedicel longer than the ovary. Perianth segments widely spreading, oblong-oval, subacute, about as long as the free portion of the perianth tube, which is cylindrical and slightly enlarged towards the apex. Crown about half the length of the perianth segments, widely tubular-funnelshaped, slightly plaited especially towards the apex, the margin with 6 shallow rounded entire or faintly crenate lobes.

In meadows. Naturalised at Kilvington, near Thirsk, Yorkshire, and in a field near Guisbro' Spa. Mr. Dillwyn states that it grows in a little park at Margam, near Swansea, and Mrs. D. Llewelyn has shown him good reason to believe that it has been growing there for at least two centuries. I have seen specimens in the British Museum from Hornsey, Middlesex, in Buddle's Herbarium.

[England.] Perennial. Late Spring.

Bulb and leaves very similar to those of N. Pseudo-narcissus. Scape 10 to 18 inches high, very slightly compressed. Spathe similar to that of N. Pseudo-narcissus, but the flower has a considerably longer pedicel, and the bud is but slightly inclined before expanding. Perianth segments 1¼ inch long, pale yellow. Crown about ¾ inch long, bright yellow, shading into orange towards the apex. The mature capsule and seeds I have never seen.

M. Gay thinks it is not improbable that N. incomparabilis may be a hybrid between N. Pseudo-narcissus and N. poeticus. Hybrids are very freely formed in the genus Narcissus, a number of them are cultivated in gardens, and a few have been found in a wild state.

Short-crowned Daffodil.

French, *Narcisse nonpareil.*

This species is the well-known cottage-garden flower called by rustics "Butter and eggs," a name given it on account of the delicate primrose yellow or white of the sepals and petals, and the deep yolk-of-egg colour of the cup. It varies, like the others, with double flowers, and when in that condition is generally a greater favourite.

SECTION III.—EU-NARCISSUS. *Coss.* & *Germ.* (Narcissus, *Parl.*)

Scape many- or several-flowered (rarely 1- or 2-flowered), usually rather longly pedicellate. Perianth tube above the ovary cylindrical, sometimes slightly enlarged upward; perianth segments usually broad. Crown saucershaped or subrotate or cupshaped or urceolate-tubular, shorter than the perianth segments, usually very much shorter. Stamens of unequal length, three long and three short, their filaments adnate to the perianth tube up nearly to the apex, which alone is free and incurved.

SPECIES III.—**NARCISSUS BIFLORUS.** *Curt.*

PLATE MDIII.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLXV. (?).
Billot, Fl. Gall. et Germ. Exsicc. No. 3231.

Leaves linear-lorate, scarcely tapering towards the apex, widely channelled, very slightly glaucous. Scape about as long as the leaves when in flower. Flowers 2 together (more rarely 1 or 3). Pedicel much longer than the ovary when in flower. Perianth segments widely spreading, broadly obovate-oval, obtuse, apiculate, about as long as or a little shorter than the free portion of the perianth tube, yellowish-white. Crown very short, saucershaped, with a crisped and crenulated margin, wholly pale yellow, with the margin at length becoming scarious and white.

In meadows and orchards. Naturalised in many places in England. I have specimens from the Isle of Wight, Devon, Sussex, and York. Rare and local in Ireland, and there found in some localities where it has the appearance of being wild.

[England, Ireland.] Perennial. Late Spring, early Summer.

Bulb flowering when about the size of a walnut, covered with a dull brown skin. Leaves similar to those of the preceding species, but more strongly keeled and much less glaucous. Scape compressed, with two sharp angles. Flowers commonly 2, but not unfrequently 1, and sometimes 3. Free portion of perianth tube rather more than 1 inch long, slender, subherbaceous; perianth segments scarcely 1 inch long, very broad, overlapping each other, white with a very indistinct yellowish tinge. Crown about $\frac{1}{6}$ inch high, yellow, much contracted at the throat. The mature capsule and seeds I have not seen.

Two-flowered Narcissus.

SPECIES IV.—**NARCISSUS POETICUS.** *Linn.*

PLATE MDIV.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLXIV. Fig. 808.
Billot, Fl. Gall. et Germ. Exsicc. No. 659.

Leaves linear-lorate, scarcely tapering towards the apex, channelled, more or less glaucous. Scape about as long as the leaves, or a little longer when in flower. Flower solitary. Pedicel longer than the ovary. Perianth segments widely spreading, oval-oblong or broadly oval, obtuse, apiculate, about as long as or a little shorter than the free portion of the perianth tube, pure white. Crown very short, subrotate, saucershaped, yellow, with a spreading crenulated bright red margin.

In meadows and orchards. Naturalised in a few places; very abundant in a field at Blabers Hall, Warwickshire, from whence I received a large supply of living specimens from the late Rev. W. S. Bree. I have also specimens from Shorne Warren, near Gravesend, Kent. It has occurred in Norfolk; but, except in the three counties above mentioned, I am not aware of its being considered even a naturalised plant. Its occurrence in Ireland seems to be doubtful.

[England.] Perennial. Early Summer.

Bulb flowering when about the size of a walnut, tapering more gradually upwards than in N. biflorus, and covered with thicker brown coats. Leaves more glaucous, more deeply channelled, more twisted, and more flaccid than those of N. biflorus. Free portion of perianth tube $1\frac{1}{4}$ inch long; perianth segments 1 to $1\frac{1}{8}$ inch, of thicker texture and much purer white than the preceding; the crown shorter, more expanded, and with a bright red margin. Capsule trigonous-ovoid, $\frac{3}{4}$ inch long. Seeds about the size of white mustard seed, black, at first smooth and shining, afterwards rugose.

Poet's Narcissus.

French, *Narcisse des poëtes.*

The Narcissus of the Greeks is no doubt the *Narcissus poeticus*, which has a flower with a very powerful scent, and was attractive even to the gods, according to ancient song. Proserpine, when carried away by Pluto, was said to be occupied in gathering

> "Daffodils
> That come before the swallow dares, and take
> The winds of March with beauty."

The Narcissus was consecrated to the Furies, who stupefied their victims with its scent; hence Sophocles called these flowers

> "Garlands of the infernal gods."

The fable of the youth Narcissus, after whom the plant is named, is well known to everybody,—how he fell in love with his own image reflected in the water, and pined away until he was changed into the pale flower which rightfully bears his name.

The Chinese regard the Narcissus as worthy of a place in the decorations of the shrines of their household gods, and place large china dishes of its blossoms before them on the first day of the new year, for which purpose the roots are planted in pots filled with pebbles and water, just in time to cause them to blow for this festival.

A handsome double variety of this species is sometimes found in gardens, as also some with purple or deep yellow cups.

TRIBE II.—AMARYLLEÆ.

Perianth without any crown or petaloid tube in the throat.

GENUS II.—LEUCOIUM. *Linn.*

Perianth coloured, petaloid, regular; tube not extending beyond the ovary; limb cupshaped-funnelshaped or -bellshaped, of 6 ovate or elliptical-oblong divisions, which are free to the base, all similar, ascending, the three inner as long as the outer, but rather narrower. Crown absent. Stamens 6, inserted on the epigynous disk of the ovary; filaments very short; anthers connivent, not aristate, opening by longitudinal slits. Ovary adhering to the tube of the perianth, green, ovoid; style filiform-clavate; stigma undivided. Capsule ovoid, herbaceous, loculicidally 3-valved. Seeds few, subglobular, with a black and crustaceous testa; or subglobular or ovoid, with a pale and somewhat fleshy testa: in the last case furnished with an enlarged caruncule.

Herbs with coated bulbs and linear-lorate or linear or semicylindrical green leaves. Spathe of one or two leaves, scarious, with one or two herbaceous stripes where it is of one piece. Flowers solitary or several in an umbel, pedicellate, pendulous, rather large, white or tinged with pink, the segments frequently with a green spot close to the apex.

The name of this genus is derived from the Greek λευκός, white, and ἴον, a violet.

SPECIES I.—LEUCOIUM ÆSTIVUM. *Linn.*

PLATE MDV.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLXII. Fig. 805.
Billot, Fl. Gall. et Germ. Exsicc. No. 3230.

Leaves broadly linear-lorate, nearly flat, green, not glaucous, appearing in winter before the flowers. Scape stout, ancipitate. Spathe 1-valved, entire at the apex, nearly as long as the longest pedicels. Flowers 2 to 6. Perianth segments rhombic-oval, connivent into a wide bellshaped funnel. Style clavate-cylindrical, with a conical apex. Seeds soft, white, suborbicular, without a prominent caruncule.

In wet meadows. Apparently native by the Thames, where it has been reported from the neighbourhood of Reading, the Isle of Dogs, and on the Essex shore opposite Woolwich, and at the south end of Dagenham Breach; I have seen it plentifully between the embankment and the river below Greenwich, opposite Blackwall, on the ground now occupied by the works of the Blakeley Gun Company, and behind the butts at Plumstead. In the old "Botanist's Guide," it is said to be "a troublesome weed in pastures at Little Stoneham," Suffolk; and in the same work it is reported to occur in a moist meadow at Upton, and in a peat-field at Dorney, Buckinghamshire. It was formerly found by the Avon near Stratford, and the banks of the Isis near Oxford. Its occurrence in Dorsetshire rests on old authority, and probably L. vernum may have been mistaken for it in that county.

England. Perennial. Early Summer

Bulb flowering when about the size of a nutmeg, with a whitish covering. Leaves and scape enclosed by a few scarious sheaths, appearing in the beginning of winter, linear-lorate, slightly channelled, straight, shining, green, $\frac{3}{4}$ to 1 inch wide when full grown. Scape about as long as the leaves when in flower, 9 to 18 inches high, hollow, two-edged. Spathe at first subherbaceous, afterwards scarious, with a green point. Flowers 3 to 6, expanding in succession, erect in bud, drooping when expanded; the pedicels very short at first, afterwards much longer and drooping. Perianth segments about $\frac{3}{4}$ inch long, rhombic-oval, acuminated into a small obtuse point, white, with concolorous veins, and a green spot immediately below the apex both without and within; when in flower the segments are connivent into a wide bellshaped funnel, but afterwards the form of the perianth is more nearly cylindrical. Anthers yellow, subapiculate. Style white, with a green ring near the apex. Scape lying on the ground when the fruit is ripe. Fruit ¾ to 1 inch long, herbaceous, turbinate-oblong-ovoid. Seeds about the size of sweet-pea seeds, with a soft whitish testa.

L. æstivum in its typical form is less often met with in cultivation than the subspecies L. Hernandezii of Cabassedes, a native of southern Europe, which frequently does duty for L. (eu-)æstivum in botanic gardens, and is sold by seedsmen under the name of L. pulchellum. This form flowers from three weeks to a month earlier than C. eu-æstivum and has the flowers smaller, little more than ½ inch long, the perianth segments more incurved, so that the perianth is somewhat ovoid, and after flowering urceolate.

Summer Snowflake.

French, *Nivéole d'été.* German, *Sommer-Knotenblume.*

SPECIES II.—LEUCOIUM VERNUM. *Linn.*

PLATE MDVI.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLXII.
Billot, Fl. Gall. et Germ. Exsicc. No. 2141.
I. C. Mansel, in *Seemann's* Journ. Bot. 1866, p. 209.
Erinosma vernum, *Herb.* *Kunth,* Enum. Plant. Vol. V. p. 474. *Parl.* Fl. Ital. Vol. III. p. 82.
Nivaria verna, *Mönch.* Meth. p. 280.

Leaves broadly linear-lorate, very slightly channelled, green, not glaucous, appearing in spring with or sometimes after the flowers. Spathe 1-valved, split or notched at the apex, usually longer than the pedicel. Flower solitary, or rarely two together. Perianth segments rhombic-oval, connivent into a wide bellshaped cup. Style clavate-cylindrical with a conical apex. Seeds soft, white, ovoid, with a large prominent caruncule at the chalaza.

On the banks and sides of a thick hedgerow on one of the declivities of the greenstone heights in the neighbourhood of Bridport, Dorset, recorded by Mr. J. Hardy of Manchester, and found in abundance by Mr. I. C. Mansel. It is "stated to have been discovered near Bicester" ("Gardener's Magazine of Botany" for July 1836. Cyb. Brit. vol. ii. p. 449).

England. Perennial. Early Spring.

Bulb flowering when the size of a large filbert. Leaves distichous, slightly channelled above and bluntly keeled below, recurved, tapering slightly from beyond the middle towards the apex; in the Dorsetshire plant attaining a considerable length before the flower expands, but in the examples of the continental plant I have in cultivation the leaves are quite short at the time of flowering; in both cases attaining ultimately a length of from 9 inches to 1 foot or more, by ⅜ to ¾ inch broad. Scape subancipitate, furnished with two sharply prominent lines, 3 to 6 inches high when in flower. Spathe 2-lobed at the apex, with an herbaceous strip running down from each lobe, showing that the spathe is composed of 2 leaves united nearly to their apex on the back. Flower almost always solitary, and apparently never more than 2. Perianth more bellshaped than in L. æstivum; segments about 1 inch long, rhombic-oval, abruptly acuminated into a minute point, the 3 outer ones broader, white with parallel concolorous veins, and a green spot immediately below the apex. Anthers yellow, subapiculate. Style white, with a green ring near the apex. Scape lying on the ground when in fruit. Fruit herbaceous, oblong-turbinate, about the size of a sloe. Seeds with a soft whitish testa, remarkable for the great enlargement at the chalaza.

I am indebted to Mr. I. C. Mansel for living specimens of the Dorsetshire plant.

Spring Snowflake.

French, *Nivéole du printemps.* German, *Frühlings-Knotenblume.*

This plant grows very abundantly in some meadows, so much so as to overpower the grass in spring; but no cattle will eat it. It is pretty and easily propagated, and does well to enliven the borders of shrubberies.

GENUS III.—GALANTHUS. *Linn.*

Perianth coloured, petaloid, regular; tube not prolonged beyond the ovary; limb funnelshaped, of 6 divisions free to the base; the 3 exterior segments oblanceolate-elliptical, concave, entire, or somewhat spreading; the 3 interior only half the length of the outer ones, erect, wedgeshaped, truncate and notched at the apex. Crown absent. Stamens 6, inserted on the epigynous disk of the ovary; filaments very short; anthers connivent, subaristate, opening by 2 terminal pores. Ovary adhering to the tube of the perianth, ovoid, green; style subulate-filiform; stigma undivided. Capsule ovoid, herbaceous, loculicidally 3-valved. Seeds few, subglobular, with a soft white membranous testa.

Herbs with tunicated bulbs and 2 or 3 linear-lorate glaucous leaves. Scape compressed. Spathe membranous, with 2 herbaceous lines. Flower solitary, pedicellate, pendulous; inner segments with a green horseshoe mark outside, and green stripes inside.

The name of this genus is derived from the Greek words, *γάλα*, milk, and *ἄνθος*, a flower, descriptive of its milky whiteness.

SPECIES I.—GALANTHUS NIVALIS. *Linn.*

PLATE MDVII.

Reich. Ic. Fl. Germ. et Helv. Vol. IX. Tab. CCCLXIII.
Billot, Fl. Gall. et Germ. Exsicc. No. 1076.

The only known species.

In pastures, meadows, and orchards, in many places in England and Scotland, perfectly naturalised, and possibly native in some of the English stations, as at the base of the Herefordshire Beacon, near Little Malvern; and near Wrexham, Denbigh. The authors of the "Cybele Hibernica" do not consider it thoroughly naturalised in Ireland.

England, [Scotland, Ireland?]. Perennial. Early Spring.

Bulb flowering when about the size of a small hazel-nut. Leaves and scape enclosed in 1 or 2 truncate scarious sheaths. Leaves 2, linear-lorate, appearing at the close of winter, along with or after the flowers, glaucous, with a furrow down the middle above and a keel beneath; edges not revolute when young, in the British form. Scape longer than the leaves when in flower, 3 inches to 1 foot high. Spathe slender, bilobed at the apex, with an herbaceous strip running down from the middle of each lobe as in Leucojum vernum. Pedicels slender, shorter than the scape or exceeding it. Flower drooping, always solitary; outer perianth segments elliptical-oblanceolate, narrowed towards the base, obtuse, concave, pure white, $\frac{3}{4}$ to 1 inch long, at first erect, afterwards spreading; the three inner segments half the length of the outer, erect, obovate-oblong, notched, and with 2 rounded lobes at the apex, white with a bilobed green spot immediately below the apex, the exterior margin of which is parallel to the two rounded apical lobes of the petal. Anthers yellow, similar to those of Leucojum, but with a much longer point. Scape lying on the ground when in fruit. Fruit herbaceous, $\frac{3}{4}$ inch long, oblong-ovoid. Seeds about the size of hemp seed, ovoid, with an enlarged chalaza and a soft yellowish-white testa.

The Galanthus plicatus or Crimean snowdrop of the nurseries is a well-marked subspecies, from south-eastern Europe and Asia Minor, larger in all its parts, distinguished by the leaves having revolute edges when young, and the apical lobes of the petal being less rounded.

Common Snowdrop

French, *Perce-neige des Parisiens.* German, *Gemeines Schneeglöckchen.*

The poetical associations which surround the appearance of this pretty little flower are numerous and popular. The German name, literally "Snowbell," is very suggestive; and Mrs. Barbauld's pretty image is worth recalling:—

"As Flora's breath, by some transforming power,
Had changed an icicle into a flower."

In the Romish Church the Snowdrop is dedicated to the Purification of the Virgin Mary.

"The flower that first in the sweet garden smiled,
To virgins sacred."

It has also been considered as the emblem of Consolation, speaking as it does of the return of spring, and hope, and brighter days, amid the darkness and repose of winter.

"Green hues of hope array us,
Our snowy bells must ring;
And low but sweetly chiming,
The joyful tidings bring!
For theirs it is to utter,—
Awake! behold the spring!"

Wordsworth has addressed a sonnet to this flower, in which he calls it—

"Chaste Snowdrop, venturous harbinger of spring,
And pensive monitor of fleeting years."

The root of the Snowdrop possesses certain nutritious and mucilaginous properties, which would render it valuable were it more plentiful. It is probable that it would make as good salep as the orchis root.

EXCLUDED SPECIES.

NARCISSUS CONSPICUUS. *D. Don.*

"Mr. W. M. Chatterley communicated this to the Botanical Society of London, localised from 'Muggeridge's farm-yard,' beyond Banstead, Surrey." (Cyb. Brit. vol. ii. p. 446.)

NARCISSUS MAJOR. *Curt.*

Templeogue (Cyb. Hib. p. 294). This is the daffodil commonly cultivated.

NARCISSUS MINOR. *Linn.*

"Thrives on the rocks below the old Castle at Penrice, and no trace can be obtained of the time when it was planted." Dillwyn's "Materials for a Fauna and Flora of Swansea," p. 36, quoted in Cyb. Brit. vol. ii. p. 446.

NARCISSUS MOSCHATUS. *Linn.*

"Has been found wild in the adjoining parish of Meriden; and has been communicated to me by its discoverer, Miss Gresley, of that place." (Rev. W. T. Bree, of Allesley, Warwickshire, in Mag. Nat. Hist. viii. 118.) "But by a second notice in the same Magazine, it would seem that some mistake had occurred, the plant being possibly a whitish variety of N. Pseudo-narcissus. See Mag. Nat. Hist. ix. 494." (Cyb. Brit. vol. ii. p. 446.)

ORDER LXXXIII.—DIOSCOREACEÆ.

Perennial herbs or undershrubs, with large tuberous fleshy or woody rootstocks, and twining stems. Leaves alternate, rarely opposite, stalked, simple, cordate or sagittate at the base, entire or rarely palmately cleft, palmately veined, with the veins branched and anastomosing. Flowers small, diœcious, in axillary spikes or racemes. Perianth regular, herbaceous or subherbaceous, in the male flowers 6-partite; in the female flowers with the tube adhering to the ovary, and the persistent limb cut into six segments. Stamens 6, inserted on the base of the perianth segments, absent or rudimentary in the female flowers; anthers attached to the filaments by the back a little above the base, introrse. Ovary rudimentary in the male flowers, in the female combined with the tube of the perianth, 3-celled; ovules solitary, most commonly 2 in each cell, anatropous; styles 3, often combined at the base; stigma inconspicuous, entire, or rarely 2-lobed. Fruit capsular, loculicidally 3-valved, or baccate and indehiscent, 3-celled (rarely 1-celled). Seeds as many as the ovules; albumen cartilaginous or hard; embryo minute

GENUS I.—TAMUS. *Linn.*

Flowers diœcious. Male flowers with the perianth campanulate, subherbaceous; limb of 6 spreading-recurved segments: stamens 6, inserted on the base of the perianth segments; filaments subulate, anthers subglobose. Female flowers with the perianth tube not extending beyond the ovary; limb subherbaceous, of six spreading-recurved segments shorter than the tube: stamens extremely small, sterile: ovary adhering to the perianth tube, green, fusiform, trigonous; style single, 3-cleft at the apex, the segments recurved; stigmas bilobed. Fruit a berry, 1-celled by the three dissepiments partially disappearing. Seeds 2 or 3 in each of the 3 imperfect cells, or sometimes by abortion only 1 in each, subglobose.

A twining herb with pear-shaped tubers, with the large end downwards, and twining stems bearing alternate stalked ovate-cordate acuminate leaves with reticulate venation. Flowers minute, in axillary racemes or spikes, much shorter in the female plant than in the male. Berries red, juicy, with a thin skin.

The name of this genus is a modification of the Latin name for the wild vine as given by Pliny, *tamnus*.

SPECIES I.—TAMUS COMMUNIS. *Linn.*

PLATE MDVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXXIX.

The only known species.

In hedges, bushy places, and open woods. Common in the south of England, more rare in the north, and not extending to Scotland or Ireland.

England. Perennial. Summer.

Rootstock a roundish-ovoid tuber, attenuated towards the top, flowering when about the size of a peach, with a fuscous-brown skin clothed with radical fibres and a white coat, deeply buried in the earth —at least this is my experience of it; but Dr. Bromfield, who is most accurate in his descriptions, says it is "very large and thick, consisting of an aggregate of irregular fusiform or digitate tubers" (Fl. Vect. p. 506). Stems wiry, herbaceous, angular, twining, often attaining a length of 5 or 6 feet or more. Leaves alternate, stalked, ovate or roundish-ovate, acuminate, deeply cordate, acute and usually produced into a long slender point, 5- or 7-ribbed, the ribs connected by numerous anastomosing veins. Stipules minute, reflexed. Flowers diœcious; the male flowers ⅕ inch across, in small clusters arranged in axillary and terminal stalked erect long slender many-flowered racemes; the female flowers in axillary subsessile recurved short few-flowered racemes. Bracts minute, subulate, scarious. Perianth of the male flowers greenish, deeply divided into six narrowly oblong slightly recurved segments. Female flowers with the ovary adnate to the tube of the perianth; the limb resembling the male flower, but smaller. In the male flowers there is a rudimentary pistil, and in the female six abortive stamens. Berries about the size of sloes, ovoid, tapering at each end, pale scarlet red, very juicy, with a smooth thin skin. Seeds 1 to 3 in each cell, subglobular, rugose, pale yellow, about the size of white mustard seed. Plant quite glabrous, the leaves green and shining, paler beneath.

All the so-called species of Tamus appear to be only sub-species. The T. Cretica, with 3-lobed leaves, indeed, is possibly only a variety of T. (eu-)communis; but perhaps the T. edulis (*Lowe*) may be a ver-species, but I have seen no specimens.

Black Bryony.

French, *Tamisier commun.* German, *Gemeine Schmeerwurz.*

This is the only British representative of a family of plants that afford several useful esculents in tropical countries, comprising the yams which form a substitute for potatoes in some districts of the torrid zone. The root of our British species resembles that of the yam, and is thick and tuberous and full of starch, but of too acrid a quality to be used safely as food. It was formerly employed as an irritant external application in rheumatism, the fresh root being simply scraped and spread as a plaister. The young shoots of the plant, when just emerging from the ground, may be eaten like asparagus, after first soaking them in water, and boiling them for some time.

No plant that our island produces is more interesting than the common Bryony, or more pleasing to watch in its development. The raphides seen under the microscope in its rootstock, stem, leaves, and fruit, are very remarkable. Mr. Gulliver remarks that the essential connection of raphides with the cell life of the species is illustrated by the constant abundance of these bodies in the red berries of *Tamus* and *Arum*, and the absence of raphides from the berries of other plants growing side by side with them in the very same soil. Irrespective of its scientific interest under the microscope, the Black Byrony is one of the most elegant of our native plants. The young shoots come up tenderly in April and May, and make so little show as scarcely to be seen. As the season advances, they ascend bushes and small trees, till, far above our heads, they form wreaths and festoons of a most picturesque appearance. Every variety of the cordate leaf is to be seen on the stems, some being long and narrow, others broad and rounded, yet all conformable to the primitive type. The petioles supply beautiful ribbon-like spiral vessels, which when properly prepared become fine objects for the polariscope. When the berries are ripe, they hang together like little grapes; the foliage turns at the same time to a tawny yellow, and if it shrivels, it is only to bring out so much better the shining scarlet, the abundant and bead-like fruit.

ORDER LXXXIV.—LILIACEÆ.

Perennial herbs, rarely with a perennial leafy, or in a few foreign species sometimes an arborescent stem. Rootstock generally a tunicated bulb or creeping rhizome. Leaves simple, entire or (rarely) serrate, sheathing at the base, often linear-lorate and parallel-veined, sometimes oblong or cordate; in the latter cases with distinct petioles, with the venation cancellate or consisting of a central midrib, from which parallel veins are given off; rarely the leaves are reduced to scales, and the branches assume the appearance of leaves (*cladodia*). Flowers perfect or (rarely) polygamous, variously disposed, often on a leafless scape. Perianth regular or rarely irregular, free from the ovary, or only slightly adhering to its base, of 6 (rarely 8 or 4) leaves, all similar and petaloid, or the outer ones herbaceous on the back (rarely all herbaceous) or monophyllous and coloured and 6-cleft or 6-toothed. Stamens as many as the lobes of the perianth and opposite to them, inserted on their base or hypogynous, rarely only 3 by the other three being sterile, or more than 6 by the addition of other sterile ones forming an additional row or crown; anthers affixed by the base, or by the middle of the back, introrse or extrorse. Ovary superior, free from the perianth tube, or rarely adhering to it at the base, with the cells half as many as the perianth segments, i.e. generally 3-celled, rarely 1-celled, or of 3 separate carpels; ovules definite or indefinite, attached to the inner angle of the cells or carpels, or parietal in those species which have a 1-celled ovary; style single or more rarely as many as the cells of the ovary. Fruit a capsule, loculicidally 3-valved, or septicidally 3-valved, or an indehiscent berry. Seeds with a testa of various consistence; albumen fleshy or horny, copious.

SUB-ORDER I.—TRILLEÆ.

Leaves of the perianth free, the outer ones herbaceous, the inner ones smaller and herbaceous or larger and petaloid, or absent, very rarely all coloured and similar. Styles or stigmas free. Fruit a berry.

Herbs with creeping rootstocks more or less thickened. Stem simple, with whorled leaves. Leaves few, with reticulated veins.

GENUS I.—**PARIS.** *Linn.*

Flowers perfect Perianth leaves free, herbaceous, at length deciduous, in two rows, variable in number, but commonly 4 in each row; the outer segments spreading or recurved; the inner ones smaller and much narrower, linear, spreading, rarely absent. Stamens 8, or twice as many as the outer row of perianth segments; filaments linear-subulate, inserted on the very base of the perianth segments; anthers appendiculate, extrorse. Ovary free, sessile, subglobose, 4- or 5-celled; ovules 4 to 7 in each cell; styles or stigmas filiform or subulate, as many as the cells of the ovary, free. Berry fleshy or dry, subglobose, with as many faint furrows as there are cells, indehiscent or bursting irregularly. Seeds subglobose-ovoid, 2 to 4 in each cell; testa membranous, fuscous, or "scarlet" (*Wallich*).

Glabrous herbs with long, horizontally creeping, rather slender white rhizomes, and a simple stem with a whorl of 4 to 10 leaves at the apex. Leaves subsessile or more or less evidently stalked, membranous, 3-ribbed, with the veins anastomosing. Flower solitary, terminal, erect, rather large.

The name of this genus refers to the even number of sepals, and is an adaptation of the Latin word *par*, equal. Another derivation given by some authors is mythological, in honour of Paris, the son of Priamus and Hecuba.

SPECIES I.—PARIS QUADRIFOLIA. *Linn.*

PLATE MDIX.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXX.
Billot, Fl. Gall. et Germ. Exsicc. No. 175.

Leaves subsessile, 4 in one whorl (more rarely 3 or 5), oval or oval-obovate, rather abruptly acuminated. Flowers with as many sepals and petals as there are leaves in the whorl. Sepals strapshaped, acute. Petals linear, very slightly exceeding the stamens. Appendage of the anthers about as long as the filament. Styles free to the base, at length revolute, about as long as the ovary, much shorter than the stamens.

In woods and shady places. Rather local, but widely distributed, extending north to the counties of Aberdeen, Moray, and Renfrew. Not known to occur in Ireland, but it "is stated by Smith to grow in the wood near Ross Castle, Lake of Killarney, but has not been found there by any subsequent observer." (Cyb. Hib. p. 278.)

England, Scotland. Perennial. Summer.

Rootstock about the thickness of a quill, white, with the annual growths strongly marked, sending up a stem at the apex; below this stem a bud is formed, which grows into a continuation of the rhizome. Stem 6 inches to a foot high, with a scarious sheath at the base and 4 sessile leaves in a whorl at the apex (rarely there are 3, 5, or even 6 leaves instead of 4); these are from 2 to 4 inches long, 3-ribbed, reticulate-veined between the ribs, slightly attenuated at the base, shortly acuminated into an acute point at the apex, deep green above, paler beneath, glabrous. Peduncle 1 to 2 inches long, terminated by a single erect flower. Sepals about 1 inch long, spreading in the form of a cross. Petals very slender, a little shorter than the sepals, and more tinged with yellow. Anthers appearing as if placed in the middle of the filament, on account of the long appendage into which their connective is produced. Berry about the size of a large black currant, globular-turbinate, slightly 4-lobed, bluish-black, with a very tender skin and a juicy interior, each cell with 4 to 6 small dark-coloured seeds with pale bases, about the size of large sago grains.

Herb Paris.

French, *Parisette à quatre feuilles.* German, *Vierblättrige Einbeere.*

The leaves and berries of this plant are said to partake of the properties of opium. The juice of the berries has been used as an ophthalmic. Linnæus says the roots are useful as an emetic, and are equal to ipecacuanha in this respect. Raphides are found in most parts of the plant, especially in the segments of the perianth.*

SUB-ORDER II.—ASPARAGEÆ.

Leaves of the perianth combined or free, all similar and generally petaloid. Styles united. Fruit a berry.

Herbs (rarely shrubs or trees) with the rootstock not bulbous, often creeping, and more or less thickened. Stem simple or branched, sometimes twining, with alternate or more rarely opposite or verticillate leaves. Leaves with parallel veins, or sometimes scarious and scalelike: the functions of the leaves are then performed by herbaceous filiform or leaflike branches (*cladodia*).

GENUS II.—**SMILACINA.** *Desf.*

Flowers perfect. Perianth leaves free or combined at the very base, coloured, deciduous, 6 (more rarely 4), spreading or spreading-recurved, all nearly similar. Stamens as many as the perianth leaves, and inserted on their base; filaments subulate or filiform; anthers short. Ovary free, 3- or 2-celled; ovules 2 in each cell; style single, short and thick; stigma obscurely 3- or 2-lobed. Berry globose, 1- or 2-seeded. Seeds subglobose; testa thin, pale.

Herbs with creeping slender or thickened rhizomes and simple erect leafy stems. Leaves sessile or shortly stalked, striate. Flowers small, white, in a terminal raceme or panicle.

It is supposed that the name of this genus is given to it on account of the presence of a alkaline principle, detected by Folchi in the root of the *Smilax Sarsaparilla,* called *smilacine.*

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* In justice to Mr. Gulliver, we must mention that for years previous to 1863 he had been engaged in observations of raphides, and that he had announced as the result of his researches, that "certain orders of plants may be readily distinguished from their allies by raphides alone." See his numerous papers on the subject in the

SPECIES I.—SMILACINA BIFOLIA. *Desf.*

PLATE MDX.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXXVI.
Billot, Fl. Gall. et Germ. Exsicc. No. 79.
Convallaria bifolia, *Linn.* Sp. Pl. p. 452.
Maianthemum bifolium, *D.C.* *Kunth*, Enum. Pl. Vol. V. p. 147. *Bab.* Man. Brit. Bot. ed. vi. p. 340. *Hook. & Arn.* Brit. Fl. ed. viii. p. 450. *Fries*, Summ. Veg. Scand. p. 64. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 814. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 230; et Auct. Plur.

Rootstock slender, branched, the branches producing a single stalked roundish-ovate deeply cordate leaf, or a flowering stem with two shortly stalked or subsessile ovate-cordate leaves, one of which is a little above the other. Flowers in a simple raceme; pedicels mostly in pairs. Perianth segments oblong, spreading-recurved. Stamens 4. Berries very small, white dotted with red.

In woods and bushy places. Very rare. On the west side of Forge Valley, near Hackness, six miles from Scarborough, Yorkshire; formerly at Hawick, Northumberland. Reported by Gerarde from Dingley Wood, near Preston; and Harewood, near Blackburn, Lancashire. There is a large patch of it in Caen Wood, between Hampstead and Highgate, but there it has the appearance of having been planted. In the Phytologist, ser. i. vol. i. p. 579, Mr. Edward Edwards states that he observed it under fir-trees in Apsley Wood, Bedfordshire.

England. Perennial. Early Summer.

Rootstock extensively creeping, white, not so thick as a crow-quill. Radical leaves on stalks 2 to 4 inches long, the stalks sheathed at the base; lamina, including the lobes, $1\frac{1}{2}$ to 3 inches long, with numerous ribs connected by transverse veins, deep green above, paler beneath, glabrous except on the veins, which are clothed with minute hairs. Stem 3 to 8 inches high, with two alternate leaves a little above the middle, the upper leaf smaller than the lower, and sometimes there is a third still smaller leaf above the second one; these leaves are stalked, the lower ones with a petiole $\frac{1}{8}$ to $\frac{3}{4}$ inch long, the upper one with a shorter petiole or sometimes almost sessile; in shape the stem leaves are more triangular than the radical leaves, being broadest at the base and not about the middle; all the leaves are deeply cordate with roundish basal lobes widely apart at their origin. Raceme $\frac{3}{4}$ to $1\frac{1}{2}$ inch long. Bracts very small, scarious. Pedicels longer than the flowers, commonly in pairs, but sometimes three together, rarely solitary. Perianth segments $\frac{1}{8}$ inch long, white. Anthers white. Berry smaller than a sweet-pea seed, acuminated at the apex, waxy-white dotted with brownish red.

I am indebted to Mr. Wilkinson of Scarborough for a fine series of fresh specimens of this plant from the Forge Valley station.

Two-leaved Smilacina.

German, *Zweiblättrige Schattenblume.*

GENUS III.—**POLYGONATUM.** *Tournef.*

Perianth tubular-cylindrical, clavate, coloured, deciduous; limb with 6 minute suberect or spreading-ascending teeth at the apex. Stamens 6, inserted in the middle of the perianth tube, included; anthers rather long. Ovary free, sessile, 3-celled; ovules 2 to 6 in each cell; style slender; stigma subcapitate, obscurely 3-lobed. Berry globose, 3- to 6-seeded. Seeds subglobose; testa thin, pale or fuscous.

Herbs with thick creeping rhizomes, and simple erect or arching leafy stems. Leaves sessile, usually alternate, rarely opposite or verticillate, striate. Flowers rather large, greenish-white (rarely pink), drooping, on axillary 1- or few-flowered peduncles.

The name of this genus is derived from the Greek words πολύς, many, and γόνυ, angle or joint, from the many joints of the rootstock.

SPECIES I.—**POLYGONATUM VERTICILLATUM.** *All.*

PLATE MDXI.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXXV

Billot, Fl. Gall. et Germ. Exsicc. No. 2546.

Convallaria verticillata, *Linn.* *Sm.* Engl. Bot. ed. i. No. 128; and Engl. Fl. Vol. II. p. 154. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 814. *Reich.* l. c. p. 5.

Stem erect, angular, glabrous. Leaves in whorls of 3 to 7, spreading all round the stem, sessile, strapshaped or lanceolate-strapshaped, wedgeshaped at the base, gradually attenuated from near the middle to the apex, acute, membranous. Peduncles from the axils of the lower and middle leaves, forked at the apex, 2- (more rarely 3- or 1-) flowered, without bracts at the fork. Flowers pendulous. Perianth tubular-cylindrical, contracted near the middle, white. Filaments papillose.

On a wooded bank not far from Smailsmouth, near Bellingham, in North Tynedale, Northumberland, where it was found by Mr. Makepeace; Den of Rechep, near Dunkeld, Perthshire. Dr. Walker-Arnott also gives two other Perthshire localities; viz., parish of Rattray (in various places), and Blair Athol.

England, Scotland. Perennial. Summer.

Rootstock about the thickness of a man's little finger, creeping. Stem erect, 15 inches to 3 feet high or more, naked at the base, angular above, with numerous whorls of leaves from below the middle to the apex. Leaves 3 to 6 inches long, green, paler beneath, much longer than the internodes, with a strong midrib and numerous parallel ribs connected by transverse veins, very finely scabrous-pubescent on the ribs and margins. Peduncles longer than the flowers, generally branched at the apex, the upper ones sometimes simple and 1-flowered. Perianth about ⅜ inch long, contracted about the middle, the limb consisting of spreading teeth, green and bearded inside. Filaments very short. Berries the size of small red currants. The ripe fresh fruit I have not seen; according to Smith it is deep blue, but Koch describes it as red.

Whorled-leaved Solomon's Seal.

French, *Muguet verticellé.* German, *Querblättrige Weisswurz.*

The origin of the common name of this plant is variously given. Dr. Prior tells us it comes from "the flat round scars on the rootstock, resembling the impressions of a seal, and called Solomon's from his seal being of frequent occurrence in Oriental tales, and a familiar expression;" while Dr. Withering considers that its reputed efficacy for "knitting together, soddering or *sealing* of broken bones," gives rise to the name. We incline to think that the shape of the flowers as they hung on the stem may have suggested the idea of seals. The virtues attributed to this plant in former times were many and great. Gerarde tells us that "the root of Solomon's Seal stamped while it is fresh and greene and applied, taketh away in one night, and two at the most, any bruise, blacke or blew spots gotten by fals or women's wilfulnesse in stumbling upon their hasty husband's fists, or such like." He adds: "As touching the knitting of bones, and that truly which might be written would seem to some incredible; but common experience teacheth that in the world there is not another herb to be found comparable to it for the purposes aforesaid; and therefore in briefe, if it be for bruises inward the roots must be stamped, some ale or wine put thereto and strained and given to drinke."

The roots macerated for some time in water yield a substance capable of being used as food, and consisting principally of starch. The young shoots form an excellent vegetable when boiled and eaten like asparagus, and are largely consumed in Turkey.

SPECIES II.—POLYGONATUM MULTIFLORUM. *All.*

PLATE MDXIII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXXIII.

Convallaria multiflora, *Sm.* Engl. Bot. ed. i. No. 279; and Engl. Fl. Vol. II. p. 156. *Fries*, Summ. Veg. Scand. p. 64. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 814. *Reich.* l. c. p. 5.

Stem arching, terete, without elevated lines, glabrous. Leaves alternate, subdistichous, ascending in two directions at an obtuse angle each other; the lower ones semiamplexicaul; the upper sessile;

all oval or elliptical, submembranous, glabrous, glaucous beneath. Peduncles from the axils of most of the leaves, except the very lowest and a few of the uppermost, 2- to 6-flowered, branched in the upper half. Flowers pendulous, clavate-cylindrical, swollen at the base, contracted near the middle. Filaments pubescent.

In woods. Rather rare, but widely distributed in England, though probably introduced in many of its stations. In Scotland it has no claims to be considered as more than a naturalised plant. In Ireland it is sparingly naturalised in a grove at Blarney.

England, [Scotland, Ireland]. Perennial. Early Summer.

Rootstock extensively creeping, about the thickness of a man's finger, marked on the upper side with scars at the extremity of each annual growth, at the places where the stems have decayed, each branch with a single stem at the apex, with a bud beneath it. Stem 18 inches to 3 feet high, appearing in spring, at first enclosed in a cylindrical-clavate spathelike sheath, which afterwards envelopes the base of the stem; lower half of the stem erect and bare of leaves, the upper part slightly arching and with numerous leaves. Leaves 3 to 6 inches long, placed alternately in two rows, those in each row obliquely ascending, and much longer than the internodes. Flowers in short subcorymbose racemes on recurved axillary peduncles which are shorter than the leaves; pedicels shorter than the flowers, usually without bracts at the base, though Reichenbach figures a form with foliaceous bracts. Perianth $\frac{3}{4}$ inch long, slightly swollen at the base, contracted above the ovary and again expanding towards the apex, which has six broadly-lanceolate teeth; the colour is greenish-white, green and bearded on the inside of the teeth. Filaments adnate to the perianth for the greater part of their length, clothed with minute hairs; anthers yellow. Style about as long as the stamens. Berry about the size of a red currant, bluish-black with a white bloom. Seeds 6 (or fewer by abortion), about the size of sago grains, pale, enclosed in dark green pulp.

Common Solomon's Seal.

French, *Muguet Sceau de Salomon.* German, *Vielblüthige Weisswurz.*

SPECIES III.—**POLYGONATUM OFFICINALE.** *All.*

PLATE MDXII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXXIV. Fig. 364.

P. vulgare, *Desf.* *Kunth*, Enum. Pl. Vol. V. p. 132. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 228.

Convallaria Polygonatum, *Linn.* *Sm.* Engl. Bot. ed. i. p. 280; and Eng. Fl. Vol. III. p. 155. *Fries*, Summ. Veg. Scand. p. 64. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 884. *Reich.* l.c. p. 5.

Stem arching, with strongly elevated lines. Leaves glabrous, subdistichous, ascending in two directions at an obtuse angle with each other, oval or elliptical, semiamplexicaul, submembranous, glabrous, glaucous beneath. Peduncles from the axils of most of the leaves except the very lowest and a few of the uppermost, 1- or 2- (rarely 3- or 4-) flowered, branched only in the lower half. Flowers pendulous, widely-cylindrical, attenuated at the base, not contracted near the middle. Filaments glabrous.

Var. α, *genuinum.*

P. vulgare, *Boreau*, Fl. du Centr. de la Fr. ed. iii. Vol. II. p. 614.

Peduncles 1-flowered, or rarely one or two of them with 2 flowers, from the peduncle being forked from the very base.

Var. β, *intermedium.*

P. intermedium, *Boreau*, l.c. p. 615.

Peduncles mostly 2- or 3-flowered (sometimes 4-flowered), branched about the middle or a little below it. Whole plant usually larger and stouter than var. α; the leaves commonly broader, closer together, and rather thicker in texture.

In woods and on the ledges of limestone cliffs. Rare. I have specimens of var. α from Gloucestershire; Settle, Yorkshire; Kyloe Crags, Northumberland; and a doubtful form from Leigh Wood, Somerset: var. β from Colerne, Wilts. Besides this, the plant has been reported from Dorset, Hants, Kent, South Wales, and the Lake district; but I am unable to say which of the forms occur there: indeed, possibly in some of these counties P. multiflorum has been mistaken for it.

England. Perennial. Early Summer.

Very similar to P. multiflorum, but usually smaller, with the stems conspicuously angular, from having raised lines on it which are most developed in the upper part; the leaves usually thicker and more amplexicaul; the peduncles often 1-flowered and always few-flowered; the perianth larger (about 1 inch long), more narrowed at the base, and not evidently constricted above the ovary, and with shorter and broader deltoid teeth: the berry is precisely similar, but scarcely so large.

Of var. β I received roots from Mr. T. B. Flower; these, when planted beside P. intermedium from M. Boreau, sent me by M. Lenormand, so closely resembled the French plant, that where the two ran together by extending their creeping roots, it was impossible to say which was which. Mr. J. Tatham was kind enough to send me roots of the 1-flowered plant from Settle; but these have not yet flowered with me, so I cannot say whether they will remain distinct in the garden, though I have some suspicion that var. β is merely a luxuriant state of the plant.

My dried specimens of the Leigh Wood form are intermediate; they have mostly 1-flowered peduncles, but in other respects closely resemble var. β. The station is, I believe, now destroyed, and I have been unable to procure living plants from it.

Angular-stemmed Solomon's Seal.

French, *Muguet de serpent.* German, *Salomonssiegel.*

GENUS IV.—**CONVALLARIA.** "*Linn.*" *Auct.*

Flowers perfect. Perianth cupshaped-bellshaped, coloured, deciduous; limb with six large recurved teeth at the apex. Stamens 6, inserted near the base of the perianth tube, included; anthers rather long. Ovary free, sessile, 3-celled; ovules 2 to 6 in each cell; style thick; stigma bluntly 3-lobed. Berry globose, 2- to 6-seeded. Seeds subglobose, angulated; testa thin, fuscous.

An herb with creeping slender rhizomes and no stem, but with 2 (rarely 3) radical leaves, with the petioles enclosed in a membranous sheath. Flowers rather large, pendulous, white, in a raceme at the extremity of a naked scape.

The name of this genus is derived from the Latin word *convallis*, a valley, because it is found abundantly in valleys.

SPECIES I.—**CONVALLARIA MAIALIS.** *Linn.*

PLATE MDXIV.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXXII.
Billot, Fl. Gall. et Germ. Exsicc. No. 290.

The only known species.

In woods. Rather local, but widely distributed throughout England. Rare in Scotland, and doubtfully native; but the Rev. G. Gordon and Mr. W. A. Stables "deem it clearly indigenous in Moray" (Cyb. Brit. vol. ii. p. 467). Naturalised in several places in Ireland.

England, Scotland, Ireland. Perennial. Early Summer.

Rootstock slender, extensively creeping, the extremity of the branches sending up in spring a pair of radical leaves on long stalks, accompanied or not by a flowering scape, the whole enclosed in several membranous sheaths one above the other. Leafstalks 2 to 8 inches long, one enclosing the other; rarely there is a third leafstalk enclosed by the second; lamina elliptical, acuminated at each end, 3 to 8 inches long. Scape 4 to 15 inches high, bearing a raceme of drooping white flowers. Peduncles recurved, solitary, 1-flowered, with scarious bracts at their base, a little longer than the flowers. Flowers ⅜ inch long, cupshaped-campanulate. Berry about the size of a large black currant, red, smooth. Leaves deep green, slightly glaucous, glabrous.

Lily of the Valley.

French, *Muguet de Mai.* German, *Gemeine Maiblume.*

This plant is popularly known as the flower of humility, and the names of "Ladder to Heaven" and "Jacob's Ladder," are commonly given to it. It is the very gem of English flowers, and is equally attractive whether we consider its lovely delicate appearance or its delicious scent. At one time it grew in profusion on Hampstead Heath, but to our sorrow has now disappeared from that locality. It still grows wild in the woods about Clifton, and is by no means peculiar to valleys, though both the English and botanical names imply that it is so. The blossoms are succeeded by large berries as big as currants. Hurdis writes some pretty lines on this charming plant, which is the delight of all who love flowers:—

> "When the blast
> Her sister tribes confounds and to the earth
> Stoops their high heads that vainly were exposed
> She feels it not, but flourishes anew,
> Still sheltered and secure. And as the storm
> That makes the high elm crouch and rends the oak
> The humble Lily spares; a thousand blows
> That shake the lofty monarch on his throne,
> We lesser folks feel not. Keen are the pains
> Advancement often brings. To be secure,
> Be humble; to be happy, be content."

The Suffolk poet, Bernard Barton, thus speaks of this flower:—

> ". . . . and sweetest to the view,
> The Lily of the Vale, whose virgin flower
> Trembles at every breeze beneath its leafy bower."

The fragrance of the freshly gathered Lily is very delicious; when dried it has a narcotic scent; and, reduced to powder, it is said to excite sneezing and to relieve disorders of the head.

GENUS V.—**ASPARAGUS.** *Linn.*

Flowers subdiœcious by abortion. Perianth bellshaped, coloured or subherbaceous, deciduous, of six leaves cohering only at the very base. Stamens 6, inserted on the base of the perianth leaves; anthers short. Ovary free, sessile, 3-celled, abortive in the male flowers; ovules 2 in each cell; style filiform; stigma 3-cleft. Berry globose, 3- to 6-seeded. Seeds subglobose, depressed; testa thin, brittle, black.

Herbs or shrubs (sometimes twining), often with creeping rhizomes and fasciculated root-fibres. Stems branched. Leaves scalelike, pellucid, producing in their axils numerous abortive filiform or subulate barren peduncles (*cladodia*), which perform the function of leaves. Flowers small, more or less tinged with green or brown, on 1-flowered peduncles, which are articulated near the middle.

Dr. Mayne gives this derivation of the name: *'Ασπάραγος*, from *ἀ* abund., *σπαράσσω*, to divide; because it is divided or lacerated in gathering; or *ἀ* priv., *σπείρω*, to sow, because the stalks are produced, not from the seed, but from the body of the plant.

SPECIES I.—**ASPARAGUS OFFICINALIS.** *Linn.*

PLATE MDXV.

Stem herbaceous, round, without spines, much branched. Cladodia clustered, terete, setaceous, smooth, flexible. Leaves scalelike, shortly spurred at the base. Peduncles articulated beyond the middle. Pedicel (perianth tube) shorter than the bell of the perianth. Anthers not mucronate, nearly as long as the filament.

Var. *α*, *campestris*.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. DXVIII.
Billot, Fl. Gall. et Germ. Exsicc. No. 2926.

Stem tall, erect. Cladodia slender, long, very flexible.

Var. *β*, *maritimus*.

PLATE MDXV.

A. prostratus, *Du Mort.* Florul. Belg. p. 178. *Thielens* in Bul. Soc. Bot. Belg. Vol. I. Tab. II. (?)

Stem short, prostrate or decumbent. Cladodia short, thick, slightly flexible.

Var. *α* occasionally as an escape from cultivation, but scarcely naturalised. Norton Spit, Isle of Wight. Var. *β* very local. Cornwall in several places, especially on Asparagus Island, at Kynance Cove. One of the forms occurs on the Chesel Bank, Dorset; formerly near Gravesend and Greenwich, Kent, but now lost; Wallasea Island and Foulness Island, 1851, also formerly near Harwich, Essex; said to occur on the Sussex, Norfolk, and Lincoln coasts; Giltar Point, Pembroke; and the Isle of Anglesea; and on the Lancashire coast, but Mr. Watson believes it originated there from cultivation. About Wexford and Waterford, Ireland.

England, Ireland. Perennial. Late Summer.

Rootstock thick, creeping, thickly clothed with membranous lanceolate scales, and emitting thick fleshy root-fibres. Stem usually somewhat geniculate, 9 inches to 2 feet long in the wild plant, much branched. Cladodia $\frac{1}{4}$ to $\frac{1}{2}$ inch long, in fascicles of three to six or more in the axils of the minute scalelike scarious leaves, which have an herbaceous spur at the base. Flowers solitary or in pairs, drooping, axillary; peduncles recurved, articulated to the pedicel (which looks like a drawn-out base of the perianth). Bell of the perianth about $\frac{1}{4}$ inch long, yellowish-olive with reddish streaks. The fruit of the coast plant I have never seen, for though Mr. Charles Bailey was good enough to send me living plants from Cornwall, they all died in the severe winter of 1866–1867. In the garden asparagus the berries are red, about the size of a red currant; seeds lenticular-orbicular or angular, black with a slightly shining testa, rugose when dry, about the size of hemp-seed, but flat.

The young shoots of this plant form the asparagus of the table; they are very thick and succulent, and sparingly clothed with triangular deciduous leaves, very much larger than the persistent leaves at the base of the cladodia.

I have seen no specimens of Asparagus prostratus (*Du Mortier*); but M. Thielens, to whom I sent a specimen of the Cornwall Asparagus, writes that he believes it to be A. prostratus (*Dum.*), but cannot be certain in the absence of the seeds, which I have been unable to procure.

Asparagus.

French, *Asperge officinale.* German, *Gemeiner Spargel*

This plant has been cultivated as an esculent since the time of the Romans, and is universally esteemed as such at the present day. The wild plant of the seashore from which our cultivated Asparagus is derived, is strongly diuretic, a property shared in some degree by the blanched shoots of the garden vegetable. Its active principle is an alkaloid called *asparagin.* For its successful culture Asparagus requires a very light rich soil, and abundant manuring. It is usually grown in raised beds about four or six feet in diameter, and with trenches two feet deep between them. Upon these beds the seedlings are planted about a foot apart, or the seeds are sown and the young plants afterwards weeded to the same distance. They require an annual top-dressing of finely divided manure, applied in the winter. The heads of Asparagus often attain a very large size, and 110 heads have been known to weigh 35 pounds.

GENUS VI.—**RUSCUS.** *Linn.*

Flowers diœcious by abortion. Perianth subherbaceous, marcescent-persistent, of 6 free leaves which are at length spreading, the inner leaves smaller than the outer ones. Stamens 3; filaments completely combined into an urceolate tube which is inserted on the base of the perianth segments; anthers in the male flower opposite the exterior leaves of the perianth, absent in the female flowers. Ovary 1-celled, sessile, contained within the tube of the filaments, 3-celled; ovules 2 in each cell; style thick; stigma peltate, entire, or 3-lobed in the abortive ovary of the male flowers. Berry globose, 1- or 2-seeded. Seeds hemispherical, plano-convex; testa firm, pale-fuscous.

Shrubs with simple or branched stems and alternate opposite or verticillate scalelike leaves, from the axils of which the coriaceous evergreen leaflike branches (*cladodia*) are produced. Flowers subsessile, minute, with scarious bracts, situated near the middle of the cladodia, so that they spring from what appear to be the leaves of the plant.

The derivation of the name of this genus seems to be from *russo colore*, because of the carnation colour of its berries.

SPECIES I.—**RUSCUS ACULEATUS.** *Linn.*

PLATE MDXVI.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXXVII. Fig. 968.
Billot, Fl. Gall. et Germ. Exsicc. No. 3228.

Stem shrubby, much branched. Cladodia evergreen, rather small, ovate, or lanceolate-acuminate, spinous-pointed, rigid, bearing on their upper surface between the base and the middle one or two flowers, with a triangular-subulate scarious bract at the base, within which are several shorter and broader wholly scarious bracteoles.

In woods, copses, and borders of fields. Rather local, but not uncommon in the south of England, but rare in the north, and perhaps not native in many of its stations; Suffolk, Glamorgan, and Leicester probably being its northern limit as an indigenous plant. Naturalised in Scotland; and said to grow in Cork and Kerry, Ireland.

England, [Scotland,] Ireland (?). Shrub. Early Spring.

Rootstock creeping, woody, with somewhat wiry thick radical fibres, and scarious scales towards the apex. Young shoots enveloped in scarious scales at the base, but after the first year these scales decay and leave the lower half of the stem bare and green. Cladodia $\frac{3}{4}$ to $1\frac{1}{2}$ inch long, those of the male plant much narrower than those of the female, a fact first pointed out, I believe, by Mr. G. Worthington Smith. In both male and female plants the cladodia are slightly twisted at their base, terminating in a yellowish spine and placed in the axil of a lanceolate-subulate scarious scalelike deciduous leaf. Peduncles of the flowers adnate to the upper surface of the cladodium, so that the flower seems to spring from the leaflike branch. Perianth scarcely $\frac{1}{8}$ inch across, yellowish-green; the three outer segments oblong, incurved; the three inner much smaller, strapshaped-linear, often tinged with purple. Anthers adhering to each other; filaments monadelphous. Berry about the size of a small black currant, bright red, with a firm skin covering mealy pulp. Seed solitary and spherical, or two and hemispherical, yellowish, dim, resembling horn. Stems lasting for two years or more.

Common Butcher's Broom.

French, *Fragon piquant.*

This plant was at one time made into besoms for butchers to sweep their blocks with, hence its popular name; it is still used in Italy for the same purpose. It is sometimes called the Knee Holly, but is much stiffer-looking and not nearly so handsome in any respect as the holly. This plant was known to the ancients, and is mentioned by Theophrastus, Dioscorides, and by Virgil in the Eclogues and Georgics

SUB-ORDER III.—LILIEÆ.

Leaves of the perianth free or combined, usually all similar and petaloid, or the three outer herbaceous on the back. Styles united. Fruit a dry capsule, loculicidally 3-valved.

Herbs, very rarely shrubs, with the rootstock commonly a tunicated or scaly bulb; or if not, the root with thickened fasciculated fibres. Stem simple, rarely branched, leafy, or absent and the leaves all radical. Leaves with parallel veins, or more rarely with a midrib from which parallel veins are given off, or with cancellate venation: very rarely the leaves are ensiform and equitant.

TRIBE I.—TULIPEÆ.

Perianth leaves free or coherent only at the base. Seeds flat, disciform or plano-convex, with the testa commonly pale brown. Rootstock a scaly or tunicated bulb. Stem generally leafy, with the leaves amplexicaul or sessile.

GENUS VII.—**LILIUM.** *Linn.*

Perianth coloured, funnelshaped or bellshaped or turbanshaped; perianth leaves 6, free but at first slightly cohering at the base, spreading-ascending, often more or less revolute towards the apex, with a slender furrowlike nectariferous pore in the flattish base, often papillose on the inside. Stamens 6, subadherent to the base of the perianth leaves; anthers affixed by their back to the filaments, extrorse. Style subcylindrical, often enlarged at the apex, straight or

curved upwards; stigma short, indistinctly 3-lobed. Capsule trigonous or hexagonal, with 6 furrows, 3-celled, loculicidally 3-valved. Seeds numerous, in two rows in each cell, horizontal, discoid, flat on both sides, margined or winged; testa rather soft, yellowish-brown.

Herbs with scaly (rarely coated) bulbs. Stem leafy. Flowers large, showy, solitary or racemose or subverticillate, erect or drooping. Leaves sessile, alternate or verticillate.

The derivation of the name of this genus appears to be from a Celtic word signifying whiteness.

SPECIES I.—**LILIUM PYRENAICUM.** *Gouan.*

PLATE MDXVII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCLIII. Fig. 992.
Billot, Fl. Gall. et Germ. Exsicc. No. 1078.
L. pomponium, *Linn.* (ex parte). *Bab.* Man. Brit. Bot. ed. vi. p. 342 (non *Auct. Plur.*).

Bulb subglobular, acute, with rather thin narrowly oblong-lanceolate acute scales. Stem stout, glabrous, leafy nearly to the top. Leaves scattered, crowded; the lower ones elliptical-strapshaped; the upper strapshaped, acute, glabrous except on the margin and principal ribs, beneath which are single rows of white papillæ. Leaves at the base of the terminal umbel broadly strapshaped, in a whorl of 3 to 5. Flowers pendulous, 2 to 8, two or three of them in a terminal umbel, generally with a few axillary ones arranged in a raceme below those in the umbel. Perianth leaves oblong-lanceolate, connivent for less than half their length and revolute for the remaining part, yellow with purplish-black elongate raised papillæ. Style rather thick, twice as long as the ovary, curved upwards.

Not native. Extending for about fifty yards on a hedge-bank on each side of the road at Sheepwash Farm, between South Molton and Mollond, North Devon, about a mile and a quarter from the latter place. Discovered by Mr. George Maw.

[England.] Perennial. Summer.

Bulb flowering when about the size of a small apricot, with brittle fleshy yellowish-white or pale yellow scales. Stem 1½ to 4 feet high. Leaves very numerous, not whorled, except at the base of the peduncles, bright green, paler beneath, 2 or 4 inches long, spreading, the uppermost ones ascending; peduncles 2 to 6 inches long, curved immediately below the apex, so that the flower is drooping, but straight in fruit, so that the latter is erect. Flowers 1½ inch across, the upper two-thirds of the perianth segments recurved so as to give the flower the appearance of a flattened yellow ball. Anthers chocolate;

pollen abundant, bright scarlet. Capsule 1½ inch long, oblong-prismatic, with six blunt angles. Seeds flat, light brown, $\frac{3}{10}$ inch across, with a rather narrow border.

This is certainly distinct, at least as a subspecies, from the plant called L. pomponium by Kunth, Parlatore, Grenier and Godron, etc., which is the L. rubrum of Lamarck: this is a much slenderer plant, with narrower leaves crowded below but remote towards the apex of the stem; the flowers are produced earlier than in L. pyrenaicum, and are of a bright orange-scarlet. The L. rubrum is also not nearly so hardy as L. pyrenaicum.

Yellow Martagon Lily.

French, *Lys des Pyrénées.* German, *Feuer-Lilie.*

SPECIES II.—LILIUM MARTAGON. *Linn.*

PLATE MDXVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCLI.
Billot, Fl. Gall. et Germ. Exsicc. No. 1768.

Bulb subglobular, acute, with rather thin narrowly oblong-lanceolate acute scales. Stem rather stout, minutely puberulent or thinly hairy, nearly bare of leaves on the upper part. Leaves (except the upper ones) in rather remote whorls of 5 to 8, elliptical or elliptical-oblanceolate or -obovate, acute, glabrous; upper leaves and those at the base of the peduncles alternate and narrower than the others, the uppermost linear-strapshaped. Flowers pendulous, 3 to 8 or more, all in a lax raceme. Perianth leaves narrowly elliptical-oblong, connivent for less than half their length, revolute for the remaining part, pale lurid purple with purplish-black roundish raised papillæ. Style slender, thickened towards the apex, twice as long as the ovary, at length curved upwards.

Not native, but perfectly naturalised in a copse by the side of Headley Lane, near Mickleham, Surrey. It has occurred in several other places, but it does not appear to be so well established anywhere as at Mickleham, where it might readily be mistaken for a native plant, but for the fact that the copse is of artificial origin; and as the plant grows nowhere else in the neighbourhood, it must have been introduced at or after the formation of the copse.

[England.] Perennial. Late Summer

Bulb flowering when about the size of a greengage plum, with pale yellow fleshy scales. Stem 18 inches to 4 feet high or a little more. Leaves few, in distant spreading whorls, the largest 3 to 7 inches long, the upper ones much smaller and alternate. Flowers about 1½ inch across, varying in colour from dull purple to dull flesh-colour or even white. Anthers maroon; the pollen reddish-maroon. Capsule shortly oblong-prismatic, a little more than 1 inch long, with 6 rather prominent angles. Seeds brown, about $\frac{1}{2}$ inch across, with a narrow margin.

Purple Martagon Lily.

French, *Lys Martagon.* German, *Türkenbund-Lilie.*

GENUS VIII.—**FRITILLARIA.** *Tournef.*

Perianth coloured, bellshaped; perianth leaves 6, caducous, free at the base, erect, sometimes slightly recurved at the apex, with an orbicular or furrowlike nectariferous pore in the concave base, not papillose on the inside. Stamens 6, subadherent to the base of the perianth leaves; anthers affixed by their back to the filaments, extrorse. Style elongate, cylindrical; stigma long, deeply 3-partite. Capsule trigonous or hexagonal, with 3 or 6 furrows, 3-celled, loculicidally 3-valved. Seeds numerous, in two rows in each cell, horizontal, discoid, flat on both sides, margined or winged; testa somewhat spongy, brown or yellowish-brown.

Herbs with scaly bulbs, the scales often few in number and very thick. Stem leafy, the leaves sessile, alternate or verticillate. Flowers large, showy, pendulous, solitary and terminal or racemose or verticillate.

The name of this genus is said to come from *fritillus*, a dice-box, which the form of the blossoms is supposed to resemble; while the specific name, μελεαγρὶς (also applied to the Guinea-hen, *Numida Meleagris*), is descriptive of its chequered appearance—not unlike that of a chess-board.

SPECIES I.—**FRITILLARIA MELEAGRIS.** *Linn.*

PLATE MDXIX.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXLII. Fig. 974.
Billot, Fl. Gall. et Germ. Exsicc. No. 1077.

Bulb depressed-subglobular, with 2 large thick opposite exterior scales. Stem slender. Leaves all alternate, rather distant, strap-shaped, attenuated at both ends, dim and slightly glaucous above, shining and dark green beneath. Flowers solitary, very rarely 2 or 3 in a raceme, pendulous, campanulate-cupshaped, tesselated with pale and dark purple or maroon, about as long as wide. Perianth leaves elliptical-oblong, not recurved at the apex; the three outer with a blunt ridge at the base on the outside; nectariferous pores narrow, elongate. Capsule oblong-ovoid, bluntly trigonous.

In damp meadows. Rare. It has occurred in the counties of

Somerset, Dorset, Wilts, Sussex, Surrey, Berks, Oxford, Bucks, Middlesex, Herts, Suffolk, Norfolk, Gloucester, Leicester, Stafford, Salop.

England. Perennial. Early Summer.

Bulb flowering when about the size of a large black currant, consisting of 2 very thick scales, which after flowering enclose 2 minute ones which form the bulb for the succeeding year, the old scales perishing in autumn. Stem when barren 3 to 6 inches high: when flowering 9 inches to 1 foot, and in fruit 1 foot to 18 inches high. Leaves few, the longest 3 to 6 inches, slightly channelled. Flower-buds tapering. Flower about 1½ inch long, and nearly as wide across the mouth, strongly tesselated with purple or purplish-maroon on a pale ground, sometimes cream-white with obscure tesselation or without any marking. Anthers yellow. Capsule about ¾ inch long, and nearly as broad, very bluntly 3-lobed. Seeds fawn-colour, flat, semicircular, with the margin about half as broad as the least diameter of the solid part.

Common Fritillary.

French, *Fritillaire méléagre.* German, *Gemeine Schachblume.*

This pretty plant is not very common, but so peculiar and attractive, that when once seen it is seldom forgotten. In some districts it covers acres of ground, and is commonly known as the Snake's-head Lily. In some localities it is called the "Toad's-head." The Christchurch meadows at Oxford are covered with its pretty flowers early in the year; and we fancy these chequered bells must be associated in the mind of many a student with his happy undergraduate days in this famous seat of learning.

GENUS IX.—**TULIPA.** *Tournef.*

Perianth coloured, bellshaped or bellshaped-funnelshaped; perianth leaves 6, free, caducous, ascending or more or less recurved towards the apex, destitute of a nectariferous pore, not papillose within. Stamens 6, scarcely adhering to the perianth leaves; anthers inserted by their base upon the filaments. Style absent; stigma short, deeply 3-lobed, the lobes often waved. Capsule fusiform-prismatic, trigonous, attenuated at each end, or more so at the base than at the apex. Seeds numerous, in two rows in each cell, horizontal, discoid, flat on both sides, very faintly margined; testa rather soft, yellowish-brown or reddish-brown.

Herbs with coated bulbs of a few fleshy convolute scales, and leafy stems with semiamplexicaul or sessile leaves. Flower large, commonly solitary, erect when expanded, but sometimes drooping in bud.

The name of this genus comes from the word *tulipan*, a turban, in allusion to the form of the blossom.

SPECIES I.—TULIPA SYLVESTRIS. *Linn.*

PLATE MDXX.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXLVI.
Billot, Fl. Gall. et Germ. Exsicc. No. 1550.

Bulb producing a single new bulb and no offsets within its coats, but throwing out a stolon, at the extremity of which an offset bulb is formed; coats brown, not woolly inside. Leaves slightly glaucous, strapshaped-elliptical, or the upper ones strapshaped, gradually attenuated into an acute point. Flowers 1 (rarely 2 or 3), yellow, drooping in bud. Outer perianth leaves elliptical-oval, shortly acuminate or subcuspidate; inner ones elliptical, gradually acuminate. Stigma minute. Capsule broadly fusiform-prismatic, trigonous, acuminated at each end.

In woods, orchards, old chalk-pits and quarries, and in meadows and pastures. Widely distributed, but doubtfully native in England. Not native in Scotland, but naturalised here and there throughout the country as far north as Brechin, Forfarshire.

England, [Scotland]. Perennial. Late Spring, early Summer.

Bulb flowering when about the size of a filbert, and rarely attaining the size of a dried date, remarkable for not forming its offsets within the coats of the bulb, but at the end of a long stolon, a mode of increase which I do not know to occur in any other species of the genus.* Stem 1 to 2 feet high, slightly flexuous, bare of leaves in the upper half. Leaves 2 or 3, the longest 4 to 8 inches long, widely channelled, glaucous. Perianth leaves 1½ to 2 inches long, bright yellow. Anthers about ½ inch long, yellow, their filaments woolly at the base. Capsule about 1 inch long, with three ovate sides, acuminated at each end. Seeds light brown, about ¼ inch across.

The flowers are rarely produced in Britain, at least in many localities; but in gardens it flowers freely.

Wild Tulip.

French, *Tulipe sauvage.* German, *Wald-Tulpe.*

This species of Tulip, though wild, is much admired in gardens for its delicate perfume, and when double by cultivation is highly prized. The mania for expensive varieties of Tulips was at one time very remarkable, and gave rise to enormous speculations. These expensive bulbs are chiefly derived from *T. Gesneriana* of the Levant, and are prized to an extravagant degree in Holland. This taste extends to the East; and a Tulip feast is held annually in the Seraglio. Chardin's account of the symbolic meaning of a Tulip in Persia is rather ridiculous. He says that when a young man presents a Tulip to his mistress, he gives her to understand by the general colour that he is on fire with her beauty, and by the black base that his heart is burned to a cinder. In many Eastern countries the presentation of a Tulip is considered to be a declaration of love. Gerarde says of the Tulip, "I do verily think that these are the lilies of the field, because the shape of these floures resembles lilies; and in the places whereof our Saviour was conversant, they grow wilde in the fieldes, and also because of the infinite variety of colour which is to be found, more than in any other sorte of floure, and, thirdly, the wondrous beauty and mixture of these floures. This is my opinion, and these are my reasons which any may approve or gainsay as he shall think good." After all the disquisition, however, as to which is the lily of the field, it seems most likely that a species of Martagon lily, called *Lilium Syriacum*, is the flower which our Saviour especially bade us consider. Among cultivators and fanciers of Tulips, those that are of one colour are called "Selfs;" when the flowers are white, with violet, brown or purple markings, they are called "Bybloemens;" when white, and the markings are any shade of pink, red, or crimson, they are "Roses;" and when the ground is yellow marked with purple, scarlet, red, or any other contrasted colour, they are "Bizarres." The last are prone to become double, and these afford excellent examples of teratology, the ovary becoming partially converted into petals, with ovules along the margin. The Dutch have long been famous for their success in the cultivation of the Tulip, and we hear of fabulous prices being given for rare bulbs; indeed, at one time in England, as well as on the Continent, the passion for this flower became something marvellous, and resulted in a series of the most extraordinary speculations, amounting to a mania, now written of as the "Tulipomania." It is recorded in the register of Alkmaar in Holland, that in 1639, 120 tulips with the offsets were sold for 90,000 florins, and that one called "The Viceroy," sold for 4,203 guilders. The States at last put a stop to this ruinous traffic, which became in fact a gambling transaction, and was carried on in the same manner as the sale of stocks on the Stock Exchange.

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* M. Grenier has transposed this character in his descriptions of Tulipa sylvestris and T. Celsiana.

GENUS X.—LLOYDIA. *Salisb.*

Perianth coloured, widely rotate-funnelshaped or -cupshaped; perianth leaves 6, free, persistent, spreading, with a transverse plaitlike nectariferous pore at the flat base, or without a nectariferous pore, not papillose within. Stamens 6, adhering to the base of the perianth leaves; anthers inserted by their base upon the filaments. Style cylindrical-subclavate; stigma trigonous. Capsule trigonous, 3-celled, loculicidally 3-valved. Seeds numerous, in two rows in each cell, subhorizontal and subdiscoid, plano-convex, faintly margined; testa rather soft, dusky brown.

Herbs with a minute bulb surrounded by numerous membranous envelopes. Leaves radical and cauline, linear; those on the stem sessile. Flowers small, erect, generally solitary, white, marked with reddish lines on the inside.

This genus is called after a botanist named Lloyd, a famous Cambrian antiquary, linguist and botanist, the discoverer of the plant on the mountains of Carnarvonshire.

SPECIES I.—**LLOYDIA SEROTINA.** *Reich.*

PLATE MDXXI.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXL.
Billot, Fl. Gall. et Germ. Exsicc. No. 1769.
Anthericum serotinum, *Linn.* *Sm.* Engl. Bot. ed. i. No. 793; and Engl. Fl. Vol. IV. p. 150.

Bulb very small, covered as well as the lower part of the stem with numerous fuscous sheaths. Leaves filiform, semicylindrical-trigonous, those on the stem short and slightly dilated below. Flowers solitary, or 2 on a stem. Perianth rotate-cupshaped, not attenuated below; the leaves with a transverse nectariferous pore a little above the base. Capsule turbinate, 3-lobed, scarcely longer than broad.

On rocky ledges. Very rare, and confined to the Snowdon range of mountains in Carnarvonshire, whence I have specimens labelled "Clogwyn Ddu" and "Glyder Ffawr."

England. Perennial. Early Summer.

Bulb so minute that it does not bulge out the sheaths which surround it and the base of the stem sufficiently to indicate where it ends and the base of the stem begins. Radical leaves 1 or 2, very slender, 3 to 9 inches long. Stem 2 to 8 inches long with 2 to 4 rather short leaves, and usually a single terminal erect flower, but sometimes with a second flower beneath the terminal one. Perianth spreading while in flower, about ½ inch long, oval-elliptical, obtuse, yellowish-white, with three dull reddish lines on the outside of each leaf. Capsule about the size of a pea, surrounded by the withered stamens and pistil. The ripe seeds I have not seen: Smith describes them as "angular, wrinkled, and of bright chestnut colour."

Mountain Lloydia.

French, *Loydie tardive.*

TRIBE II.—HYACINTHEÆ.

Perianth leaves free or more or less coherent. Seeds globular, with the testa commonly black. Rootstock a tunicated bulb, or very rarely a scaly bulb. Leaves usually all radical and sheathing at the base.

GENUS XI.—**GAGEA.** *Salisb.*

Perianth coloured, yellow, widely funnelshaped-rotate; perianth leaves 6, free, subpersistent and marcescent, more or less spreading, without a nectariferous pore at the base; the outer leaves herbaceous on the back. Stamens 6, adhering to the base of the perianth leaves; anthers inserted by their base upon the filaments. Style trigonous; stigma minute, 3-lobed. Capsule ovoid-trigonous, loculicidally 3-valved. Seeds few or several, subglobose; testa rather soft, pale-yellowish.

Herbs with bulbs consisting of few scales. Leaves radical, linear-lorate. Scapes with an involucre of leaflike bracts at the base of a few-flowered subumbellate corymb of yellow flowers, opening in the forenoon and only in fine weather.

The name of this genus was given in honour of Sir Thomas Gage, a Suffolk botanist and cultivator of flowers.

SPECIES I.—GAGEA LUTEA. *Ker.*

PLATE MDXXII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCLXXVII. Fig. 1045.
Ornithogalum luteum, *Linn.* *Sm.* Engl. Bot. ed. i. No. 21; and Engl. Fl. Vol. II. p. 142.

Bulb ovate, subglobular, solitary, usually producing numerous minute bulbules at the base. Radical leaves commonly solitary, strapshaped, rather abruptly pointed, 3- to 5-ribbed. Stem leafless, with the exception of 2 unequal subopposite bracts immediately below the umbel. Peduncles glabrous. Perianth leaves oblanceolate-oblong, glabrous on the back.

In bushy places and pastures and woods. Rare, but widely distributed, extending from Somerset, Oxford, and Sussex, north to Moray, Forfar, and Perth.

England, Scotland. Perennial. Spring.

Bulb flowering when about the size of a large pea; only one enclosed in the yellowish coats, but usually there are a number of bulbules about the size of sago grains at the base. Radical leaf solitary, 6 to 18 inches long, usually a little exceeding the flowers, slender at the base, which sheaths the stem, gradually enlarging upwards until beyond the middle, deep green, slightly shining, with 3, 5, or even 7 strong ribs, and fainter intermediate ones. Stem 4 to 14 inches high, without any leaves except those of the involucre, of which the longest about equals the pedicels or slightly exceeds them, the second falls short of them, and occasionally there is a third leaf which is still shorter than the second. Pedicels 1 to 2 inches long, in a corymb with so short a rachis that it quite resembles an umbel. Perianth leaves about ⅓ inch long, yellow within, green with yellow margins on the outside, which are much broader on the three inner and narrower leaves than on the three outer. The capsule I have never seen.

I am indebted to Mr. T. B. Flower and the Hon. J. L. Warren for recent specimens of this plant.

Yellow Star of Bethlehem.

French, *Gagée grisâtre.* German, *Gelber Goldstern.*

GENUS XII.—ORNITHOGALUM. *Linn.*

Perianth coloured, white (rarely yellow), cupshaped- or widely funnelshaped-rotate; perianth leaves 6, free, subpersistent and marcescent, more or less spreading, without a nectariferous pore at the base; the outer leaves generally herbaceous on the back. Stamens 6, adhering to the base of the perianth leaves; anthers affixed by their back to the filaments, extrorse. Style trigonous; stigma minute, trigonous. Capsule ovoid or obscurely trigonous, loculicidally 3-valved. Seeds few or several, subglobose or angulated; testa hard, black or fuscous, rugose when dry.

Herbs with tunicated bulbs and linear or linear-lorate radical leaves with a white midrib, or rather broad channelled or flat concolorous leaves. Flowers rather large, opening in the forenoon and only in fine weather, on a leafless scape, in a corymb or raceme.

The name of this genus comes from the Greek words ὄρνις, a bird, and γάλα, milk, or pigeon's milk, for which "gowks" are despatched on the Feast of All Fools, the 1st of April. The same word is used by Dioscorides for the Star of Bethlehem plant.

SPECIES I.—ORNITHOGALUM NUTANS. *Linn.*

Plate MDXXIII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCLXXIII.
Billot, Fl. Gall. et Germ. Exsicc. No. 2917.
Myogalum nutans, *Link. Kunth*, Enum. Pl. Vol. IV. p. 348. *Parl.* Fl. Ital. Vol. II. p. 450.
Albucca nutans, *Reich.* Fl. Germ. Excurs. p. 110; and Ic. Fl. Germ. et Helv. Vol. X. p. 16.

Bulb subsolitary, producing very few offsets, so that the plant does not grow in large clumps. Leaves not decayed at the time of flowering, strapshaped-linear, narrowed from beyond the middle to the apex, widely channelled above, light glaucous green with a rather broad white central stripe, glabrous. Flowers few, slightly drooping, in a lax secund raceme; pedicels shorter than the flowers, slightly recurved, becoming more so in fruit. Bracts longer than the pedicels. Perianth leaves greenish-white, broadly green on the back, especially the three outer ones. Filaments petaloid, connivent, strapshaped-oblong, 3-cuspidate at the apex, the lateral cusps as long as the anther.

In fields and orchards. Rare, and not native, but naturalised in several places. I have specimens from Bury St. Edmunds, and Atchley, Suffolk. Besides this, the counties of Surrey, Norfolk, Bedford, Worcester, Hereford, Denbigh, Notts, Derby, York, and Durham, are recorded as containing stations in which it is more or less fully established.

[England.] Perennial. Late Spring, early Summer.

Bulb flowering when about the size of a nutmeg, with whitish coats. Leaves appearing very early in spring, about as long as the scape at the time of flowering, decaying before the fruit is mature. Scape 9 to 18 inches high. Perianth leaves 1 to 1½ inch long, elliptical, greenish white, with a very broad green stripe down the middle of the back. Filaments very broad, white, about half as long as the perianth leaves; anthers yellowish-white. Fruit pendulous, subglobular-ovoid, with 6 furrows, about the size of a small nutmeg, green, fleshy. Seeds about the size of No. 5 shot, globular, dark brown, papillose-rugose even when fresh.

Drooping Star of Bethlehem.

French, *Ornithogale à fleurs pendantes.* German, *Nickende Vogelmilch.*

SPECIES II.—**ORNITHOGALUM UMBELLATUM.** *Linn.*

PLATE MDXXIV.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXVII. Fig. 1019.
Billot, Fl. Gall. et Germ. Exsicc. No. 2918.

Bulbs aggregated, producing a great number of offsets, which cause the plant to grow in clumps; these offsets produce leaves and stems while still attached to the parent. Leaves not decayed at the time of flowering, linear, tapering from about the middle to the apex, widely channelled above, bright green, with a rather broad white central stripe, glabrous. Flowers rather few, erect, in a regular corymb or corymbose raceme. Bracts ultimately much shorter than the pedicels. Pedicels longer than the flowers, ascending-erect in flower and spreading in fruit. Perianth leaves pure white, broadly green on the back, especially the three outer ones. Filaments subulate, ascending, entire at the apex.

Var. *α*, *genuinum.*

PLATE MDXXIV.

O. umbellatum, *Bor.* Fl. du Centre de la Fr. ed. iii. Vol. II. p. 624.

Leaves broadly linear, spreading-recurved when young. Flowers 5 to 12.

Var. β, *angustifolium.*

O. angustifolium, *Bor.* l. c. p. 625.

Leaves very narrowly linear, "erect when young" (*Boreau*). Flowers 3 to 5.

In meadows, pastures, orchards, etc. Not native, but found in many places in England, and a few in Scotland. Var. β in the Isle of Wight in several places (?). (See Fl. Vect. p. 501.)

[England, Scotland.] Perennial. Early Summer.

Bulb flowering when the size of a filbert, producing a number of elongate offset bulbs by which the plant increases rapidly, and thus becomes readily naturalised. Leaves commonly longer than the stem, at least in var. α, the tips withered by the time the flowers expand, and wholly decayed before the fruit is ripe. Stem 6 inches to 1 foot high. Bracts longer than the young flowers, but shorter than the fruiting peduncles. Flowers in a corymb while expanded, but the rachis lengthens after flowering until the corymb is converted into a short raceme. Perianth leaves ¾ inch long, narrowly elliptical, pure white within, with a broad green stripe down the back of each of the outer ones, and a narrow stripe down the back of the three inner. Anthers yellowish-white. Fruit oblong-turbinate, with six furrows and six prominent angles. Seeds about the size of No. 6 shot, black, nearly smooth when fresh, rugose when dry.

The flowers expand only in the forenoon, and then only when the weather is fine.

Common Star of Bethlehem.

French, *Ornithogale en ombelle.* German, *Ebenstraussige Vogelmilch.*

This plant is a native of the countries round the Mediterranean, but being frequently cultivated in gardens, has no doubt become naturalised in this country. The bulbs are nutritious, and form a palatable and wholesome food when boiled. In the East they are often eaten, and are roasted like chestnuts. Linnæus and other botanists have imagined that this plant was the substance mentioned in 2 Kings vi. 25, as having been sold at a great price during the siege of Samaria, and which our translators have rendered "dove's dung." There does not, however, appear to be much evidence in support of this opinion; and Bochart tells us that the Arabs give the name of "dove's dung" to a kind of moss that grows on trees and stony ground, and also to a sort of pulse or pea which appears to have been very common in India. Large quantities of the bulbs are parched and dried, and stored in magazines at Cairo and Damascus. It is much used during journeys, and especially by the great pilgrim caravan to Mecca, and it may easily be supposed to have been among the provisions stored up in the besieged city, and sold at the extravagant price mentioned, about half a pint for twelve shillings and sixpence. On the other hand, Morier and other travellers contend for the literal accuracy of our translation. It is the *Bolbine alba* of Pliny, and is also referred to by Theophrastus, Hist. Pl., and by Dioscorides.

SPECIES III.—ORNITHOGALUM PYRENAICUM. *Linn.*

PLATE MDXXV.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXI. Fig. 1028.

Bulb subsolitary, producing very few offsets, so that the plant does not grow in large clumps. Leaves nearly or quite decayed by the time the flowers expand, strapshaped-linear, narrowed from before the middle to the apex, widely channelled above, glaucous, without any white central stripe, glabrous. Flowers very numerous, in a rather dense elongate regular raceme. Pedicels longer than the flowers, spreading in flower, erect in fruit. Bracts ultimately a little shorter than the pedicels. Perianth leaves green, with greenish-white edges, green on the back, especially the three outer leaves. Filaments strapshaped, contracted into filiform a little above the middle, entire at the apex.

In woods and bushy places. Very local, but often abundant where it does occur. Recorded from the counties of Somerset, Wilts, Sussex, Beds, and Gloucester, and to have been formerly found in Cambridgeshire. Surrey, Middlesex, and Salop have been reported as producing it, but only on doubtful authority.

England. Perennial. Summer.

Bulb flowering when about the size of a walnut, longer and more tapering upwards than in either of the other species, and usually very deeply buried. Leaves 1 to 2 feet long, flaccid, appearing towards the close of winter, and commonly quite decayed by the time the flowers expand. Scape 2 to 3 feet high, stout, terminated by a raceme, which is densely crowded in bud, but becomes more lax in flower, and still more so in fruit. Perianth leaves about ½ inch long, pale green, with white edges on the inside, deeper green on the outside. Anthers yellow. Fruit about the size of a cherry-stone, ovoid, with 6 furrows. Seeds about the size of No. 6 shot, black, nearly smooth when fresh, rugose when dry.

Some authors divide O. pyrenaicum into two species, namely, O. pyrenaicum and O. sulphureum. Whether these are distinct or no, I have not means of deciding; but the Bath plant is the O. pyrenaicum of Boreau. By the kindness of M. Lenormand, I received from Professor Boreau living roots of his O. pyrenaicum and O. sulphureum; the former throve and flowered in London, and was precisely similar to the Bath plant sent me alive by Mr. T. B. Flower. O. sulphureum never flowered, and died after the second year; it had the leaves much less glaucous than the other.

Spiked Star of Bethlehem.

French, *Ornithogale des Pyrénées.*

This plant is a native of Greece, and is referred to by Theophrastus in his Hist. Pl.

GENUS XIII.—**SCILLA.** *Linn.*

Perianth coloured, blue or lilac, funnelshaped- or cupshaped-rotate or cylindrical or bellshaped; perianth leaves 6, free, deciduous or subpersistent and marcescent, spreading or connivent, without a nectariferous pore at the base, the outer leaves not herbaceous on the back. Stamens 6, free, or the three outer ones adherent to the perianth leaves; anthers affixed by their back to the filaments, extrorse. Style filiform or trigonous; stigma minute, obtusely trigonous or entire. Capsule obtusely trigonous, loculicidally 3-valved. Seeds few or several, angular or subglobose; testa hard, black or fuscous, nearly smooth.

Herbs with tunicated or very rarely scaly bulbs, and linear or linear-lorate radical leaves, or with rather broad channelled leaves. Flowers small or large, on leafless scapes, racemose, normally blue or lilac, but in many of the species varying to pink or white, open in all weather.

The name of this genus comes from the Greek word σκύλλω, to excite or disturb, as an emetic does the stomach.

SUB-GENUS I.—EU-SCILLA. *Coss.*

Perianth leaves free, spreading while in flower; filaments adnate to the perianth leaves only at the base. Seeds angular, without a strophiole at the base.

SPECIES I.—**SCILLA AUTUMNALIS.** *Linn.*

PLATE MDXXVI.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCLXIII. Fig. 1012.
Billot, Fl. Gall. et Germ. Exsicc. No. 664.

Bulb coated. Leaves several, appearing in autumn after the flowers, and remaining green through the winter, very narrowly linear, semicylindrical, channelled above. Flowers rather few, in an oblong raceme, spreading on all sides. Pedicels spreading-ascending in flower, incurved-erect in fruit, longer than the flowers. Bracts none. Perianth leaves spreading, pale purple with a darker stripe down the middle of each. Filaments attached only by the base to the perianth leaves.

In sandy and gravelly pastures, and on commons. Rather local, and confined to the south of England. It occurs in Cornwall, Devon, Isle of Wight, Kent, Surrey, Middlesex, and Gloucester.

England. Perennial. Late Summer, Autumn.

Bulb flowering when about the size of a filbert, but often much larger, with the outside coat brown. Leaves only beginning to appear when the flowers are expanded, and not fully developed till the commencement of winter, dark green, flaccid, at length recurved and flexuous, 2 to 5 inches long. Scape 3 to 9 inches high, two or three often produced one after the other from the same bulb. Flowering raceme ½ to 1 inch long, but in fruit sometimes lengthening till it is 3 or 4 inches. Perianth leaves ¼ inch long, oval-oblong, spreading while in flower, afterwards connivent, the colour varying from pale purple to nearly white, the midrib always darker, the dried flowers much darker purple. Anthers purple. Pedicels elongating and curving inwards till the fruit is quite erect. Capsule subglobular-turbinate, trigonous, about the size of hemp-seed. Seeds black, angular.

Autumnal Squill.

French, *Scille d'automne.*

SPECIES II.—SCILLA VERNA. *Huds.*

PLATE MDXXVII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCLXIII. Fig. 1010.
Billot, Fl. Gall. et Germ. Exsicc. No. 665.
S. umbellata, *Ramond*; *D.C.* Fl. Fr. Vol. III. p. 213.

Bulb coated. Leaves several, appearing in early spring before the flowers, and withering at the close of summer, broadly linear, widely channelled. Flowers rather few, in a hemispherical corymbose raceme. Pedicels ascending-erect both in flower and in fruit; the lower ones longer than the flowers, the upper shorter. Bracts about as long as the pedicels, scarious, transparent white, acuminate. Perianth leaves spreading, pale slaty-blue with a darker stripe down the middle of each. Filaments attached only by the base to the perianth leaves.

On sandy pastures and on ledges of rocks on the sea coast. Local. On the west coast it extends from Cornwall and Devon north to Argyle, and reappears in Sutherland, Orkney and Shetland; but on the east coast it is extremely rare, occurring in Northumberland near Howick, and between Craster and Dunstanborough; again at Gunsgreen, Berwick; but after that it does not occur till near Fraserborough, Aberdeenshire; and at Gamrie and Banff. In Ireland it is very local, and confined to the east and north coasts.

England, Scotland, Ireland. Perennial. Early Summer.

Bulb flowering when about the size of a hazel-nut, and seldom larger than a nutmeg. Leaves recurved, 2 to 9 inches long, broadest beyond the middle, deep green. Scape rarely more than one from each bulb, and apparently never more than two, 2 to 10 inches high, but commonly about 3 or 4 inches. Corymb 3- to 12- flowered. Perianth leaves $\frac{3}{10}$ inch long, oval-lanceolate, very pale dull blue when growing, but turning bright blue when dried. Capsules about the size of sweet-pea seeds, ovate-subglobular, acuminate, trigonous. Seeds subglobular-compressed and angular, black, smooth when moist, rugose when dry, nearly as large as rape-seed.

Vernal Squill.

French, *Scille du printemps.* German, *Meerzwiebel.*

A foreign species of Squill, *S. maritima*, is used in medicine, and is included in the Pharmacopœia. Squill bulbs are imported from Malta and other Mediterranean ports, and also from St. Petersburg and Copenhagen; and they are commonly brought sliced and dried. The active properties of the Squill are emetic, irritant, and expectorant. It is prescribed in dropsy, catarrh, asthma, and phthisis. In the British Pharmacopœia, syrup of Squills is admitted, and is a favourite remedy for coughs and hoarseness.

SUB-GENUS II.—ENDYMION. *Du Mortier.*

Perianth segments slightly connected at the base, more or less connivent even while in flower. The three exterior filaments adnate for half their length or more to the three outer perianth segments. Seeds subglobular, without a strophiole at the base.

SPECIES III.—SCILLA NUTANS. *Sm.*

PLATE MDXXVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCLXI. Fig. 1008.
Billot, Fl. Gall. et Germ. Exsicc. No. 2544.
Endymion nutans, *Du Mort.* *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 834. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 215. *Parl.* Fl. Ital. Vol. II. p. 478.
E. non-scriptus, *Gärcke*, Fl. von Nord- und Mittel-Deutschland, ed. vi. p. 401. *Crép.* Man. Fl. Belg. ed. ii. p. 282.
Agraphis nutans, *Link.* *Hook. & Arn.* Brit. Fl. ed. viii. p. 450. *Reich.* l. c. p. 13.
Hyacinthus non-scriptus, *Linn.* Spec. Pl. p. 453.

Bulb coated. Leaves several, appearing in early spring before the flowers, and withering in summer, strapshaped-linear, attenuated at each end, widely channelled. Flowers drooping, few or rather numerous, in a rather lax raceme which droops at the apex until after flowering. Pedicels recurved in flower, erect in fruit, shorter than the flowers. Bracts longer than the pedicels, scarious, coloured, blue, acuminate. Perianth leaves connivent into a cylindrical tube, with their tips recurved or revolute, purplish-blue, concolorous. Three outer filaments adnate to the three outer perianth leaves for the greater part of their length.

In woods, hedgebanks, shady places, and in damp pastures and meadows. Common, and generally distributed, but absent from Sutherland, Caithness, Orkney and Shetland. Frequent in Ireland.

England, Scotland, Ireland. Perennial. Late Spring,
early Summer.

Bulb deeply buried, flowering when about the size of a filbert, but sometimes as large as a small apricot, roundish, yellowish-white. Leaves spreading, 6 inches to 1 foot or more long, the longer ones nearly 1 inch broad, deep green. Scape 9 to 18 inches high or more. Raceme 3 to 8 inches long. Flowers erect in bud, but drooping when they expand, again erect in fruit. Perianth leaves nearly $\frac{3}{4}$ inch long, varying from pale to dark purplish-blue, occasionally white, and in gardens pink. Capsule ovate-subglobular, $\frac{1}{2}$ to $\frac{3}{4}$ inch long. Seeds black, globular and smooth when fresh, rugose when dry, about the size of mustard-seed.

Wood Hyacinth.

French, *Scille penchée.* German, *Sternhyacinthe.*

GENUS XIV.—**MUSCARI.*** *Tournef.*

Perianth coloured, monophyllous, ovoid or globose or cylindrical, urceolate, very shortly 6-toothed at the apex. Stamens 6, inserted on the tube of the perianth. Style filiform; stigma minute, trigonous. Capsule triquetrous, loculicidally 3-valved. Seeds few, globose; testa hard, black, rugose when dry.

Herbs with tunicated bulbs and linear, semicylindrical or channelled radical leaves. Scape bearing racemose flowers which are generally blue or yellowish-olive; the uppermost flowers often sterile.

The name of this genus comes from the Greek word *μόσχος*, musk, a smell yielded by some species.

SPECIES I.—**MUSCARI RACEMOSUM.** *D.C.*

PLATE MDXXIX.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCLVI. Fig. 999.
Billot, Fl. Gall. et Germ. Exsicc. No. 176.
M. neglectum, *Bab.* Man. Brit. Bot. ed. vi. p. 347 (non *Guss.* nec *Alior.*).
Hyacinthus racemosus, *Linn.* *Sm.* Eng. Bot. ed. i. No. 1931.
Botryanthus odorus, *Kunth*, Enum. Pl. Vol. IV. p. 311. *Parl.* Fl. Ital. Vol. III. p. 501.

Bulb producing numerous minute bulbules at the base. Leaves very narrowly linear, semicylindrical, deeply channelled above or with only a furrow, spreading, at length lying on the ground and flexuous. Raceme short, oblong-ovoid, the rachis swollen in fruit. Pedicels slender, recurved in flower, shorter than the flowers, spreading in fruit. Flowers oblong-ovoid, urceolate, dim, indigo-blue, with the teeth of the limb white; upper flowers nearly sessile, erect, abortive, pale blue, smaller than the others. Capsule with 3 compressed flattened semicircular lobes, and a deep notch at the apex.

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* The separation of this genus and Bellevalia from Hyacinthus, *Linn.*, is unnatural.

In sandy pastures. Very local. Apparently a true native in Suffolk, about Packenham and Cavenham. In hedgebanks in Cambridgeshire, especially about Hinton between Cambridge and the Gogmagog Hills; but it was not observed in the county before 1827. It also grows at Norwich on the city walls. It is said to be well established on the banks of the Blackwater, near Fermoy, co. Cork, Ireland.

England, [Ireland (?)]. Perennial. Late Spring, early Summer.

Bulb flowering when about the size of a hazel-nut, producing an immense number of bulbules at the base, so that when the plant is once introduced in a locality it increases with great rapidity. Leaves almost rushlike, 3 to 8 inches long, dark green, striate, glaucous and dim above, reddish at the base. Scape 4 inches to 1 foot high, generally solitary, but sometimes a second scape is produced from the same bulb after the first. Raceme ¾ to 1½ inch long. Pedicels very slender, lengthening in fruit, when also the rachis becomes swollen to a considerable extent, and fistulous. Flowers about ⅓ inch long, crowded. Capsule scarcely ¼ inch long. Seeds subglobular, black, about the size of mignionette seed.

I have gathered this plant near Cambridge under the guidance of Professor Babington; and the Rev. Kirby Trimmer has sent me numerous fresh specimens from Cavenham Field, Suffolk.* From roots thus obtained I have cultivated the Cambridge and Suffolk plants for some time, and there is no doubt it is the M. racemosum of continental botanists.

M. neglectum (*Gussone*), to which the British plant is referred by Professor Babington, is a subspecies of M. racemosum, twice as large in all its parts as the form above described, the leaves much stiffer, broader, flatter, more enlarged towards the apex, the raceme often 3 inches long; flowers and capsule much larger, the former appearing much earlier than those of M. (eu-)racemosum. M. neglectum is sold in the nurseries as M. racemosum, and does duty for it in most botanic gardens; but the M. (eu-)racemosum appears to be rare in cultivation.

M. racemosum of Miller is apparently M. botryoides, *D.C.*, or one of its subspecies, and his M. botryoides is M. racemosum, *D.C.*; but Miller's specific names (arising from his misunderstanding Hyacinthus racemosus and H. botryoides of Linnæus) have not been adopted by subsequent writers.

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* "Field," in Suffolk, is applied, not to an enclosure, but to an uncultivated open sheepwalk.

Starch Hyacinth.

French, *Muscari à grappe.* German, *Traubige Bisamhyacinthe.*

This plant is often called the Hyacinth erroneously, but may be easily distinguished from it, although flowering about the same time. The original Hyacinth was a name given by the ancient Greeks to the flower which was said to have sprung from the blood of the beloved of Apollo, when slain by the rival Zephyrus. The Starch Hyacinth has a cluster of small dark blue flowers, almost like little grapes; hence it is sometimes called the Grape Hyacinth. It smells of wet starch; hence the English name. The roots of this plant, and also those of the Hyacinth, are poisonous.

GENUS XV.—ALLIUM. *Linn.*

Perianth coloured, widely funnelshaped or cupshaped or connivent or bellshaped; perianth leaves 6, free or combined at the base, subpersistent, spreading or connivent, without a nectariferous pore at the base, the outer leaves not herbaceous on the back. Stamens 6, adhering to the base of the perianth leaves; filaments frequently monadelphous, or the three inner ones 3-cuspidate; anthers affixed by their back to the filaments, extrorse. Style filiform; stigma minute, entire, very rarely 3-lobed. Capsule trigonous or triquetrous, often depressed at the apex, loculicidally 3-valved, 3-celled or 1-celled, sometimes adhering to the perianth at the base. Seeds 1 or 2 in each cell of the capsule, triquetrous or compressed-triquetrous, more rarely subglobose; testa hard, black, usually rugose when dry.

Herbs with tunicated bulbs, and radical leaves which sometimes sheath the scape so as to be pseudo-cauline: the upper and under surfaces of the leaves often more or less separated, so that they are fistulous or subfistulous. Scape terminated by an umbel of flowers of various colours; flower buds enclosed in a 1- or 2-valved more or less membranous spathe. Bulbs free or adhering to a creeping thickened rhizome.

The name of this genus comes from the Greek word ἀλέω, to avoid, because of its offensive smell.

SECTION I.—PORRUM. *Don.*

Destitute of a creeping rhizome. Stem apparently leafy, from the leafsheaths surrounding it. Stamens free; filaments of the 3 interior stamens flattened, split at the apex into 3 subulate cusps, of which the centre one bears the anther. Spathe with a rather short entire beak.

SPECIES I.—ALLIUM AMPELOPRASUM. *Linn.*

PLATES MDXXX. MDXXXI.

Bulb at the time of flowering consisting of 2 (rarely of 3 or 4) large slightly unequal white offsets (one on each side of the flowering stem) within the coats, and commonly producing a number of whitish hemispherical acuminated shortly-stalked bulbules about the size of peas at the base. Leaves not fistulose, all sheathing the scape from its base to about its middle, very broadly linear, folded, glaucous, scabrous on the edges and midrib, the apex hooded and the sides pressed flat together when young. Scape cylindrical. Spathe 1-valved, ovate, subglobose, scarious, abruptly acuminated into a subherbaceous compressed beak about as long as the rest of the spathe. Flowers in a dense globular umbel, with or without head-bulbules. Perianth leaves connivent, gibbous, with a scabrous keel on the back of the 3 exterior. Stamens included, the 3 interior filaments 3-cuspidate, the antheriferous cusp about as long as the undivided part, and the lateral cusps considerably longer. Capsule ovate-subglobose, indistinctly trigonous. Seeds 2 in each cell. Head-bulbules absent, or greenish and subglobular, usually distorted and angularly compressed at the base by mutual pressure.

Var. α, *genuinum.*

PLATE MDXXX.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCLXXXIX. Fig. 1072.

A. Ampeloprasum, *Sm.* Engl. Bot. ed. i. No. 1657. *Bab.* Man. Brit. Bot. ed. vi. p. 344 (ex parte).

Head-bulbules none. Flowers very numerous, disposed in a compact globe, whitish, tinged with pale purplish-rose, and with a green midrib.

Var. β, *bulbiferum.*

A. Ampeloprasum, *Bab.* Man. Brit. Bot. ed. vi. p. 344 (ex parte).

Head-bulbules few or several, rarely as large as peas. Flowers very numerous, disposed in a compact globe, whitish, tinged with pale purplish-rose, and with a green midrib.

Var. γ, *Babingtonii.*

PLATE MDXXXI.

A. Babingtonii, *Borrer*, in Engl. Bot. Suppl. No. 2906. *Bab.* Man. Brit. Bot. ed. vi. p. 344.

A. Halleri, *Bab.* Man. Brit. Bot. ed. i. p. 305 (non *G. Don*).

Head-bulbules very numerous, from the size of peas to that of small hazel-nuts, forming a compact globular head, from which the pedicels of the flowers project rather thinly; these pedicels are often of unequal length, and sometimes proliferous. Flowers pale rose-coloured, darker at the apex, with the midrib greenish.

On rocky places and on hedgebanks. Var α naturalised on Steep Holmes Island, in the estuary of the Severn. Var. β doubtfully wild on ledges of rock below St. Peter's Barracks, Guernsey. Var. γ doubtfully wild in orchards at Grade and Ruan Minor, Cornwall; near Little Bredy, Dorsetshire; truly wild in several places in the Great Isle of Arran, co. Galway; also "on Illan Glas, opposite Roundstone" (Professor Babington); "near Roundstone, sparingly" (Professor Olliver).—Cyb. Hib.

[England,] Ireland. Perennial. Late Summer, early Autumn.

The Steep Holmes plant flowers when the bulb is about the size of a greengage plum. At the time of flowering this bulb has on each side of the flowering stem a large roundish-ovate compressed offset, one of which flowers the next year; besides this, there are usually towards the base a number of subhemispherical angular acuminated shortly-stalked bulbules, which do not flower for several years after their first appearance. According to Mr. Borrer, there are sometimes three or four offsets in the bulb; but this I have never met with. The coats of the bulb are white. The stem is about the thickness of a man's finger at the base, and tapers upwards, attaining a height of 3 to 6 feet. Leaves distichous, all sheathing the stem so that it appears to be leafy; but, as is the case in all other species of the genus which have apparently leafy stems, the leafsheaths spring from the bulb, of which the bases of the leaves form coats; the lamina is 8 to 18 inches long by $\frac{3}{4}$ to 1 inch or $1\frac{1}{4}$ inch broad, folded so as to form a gutter along the midrib, keeled on the back, the keel and margins rough with minute cartilaginous prickles; the leaves appear at the close of autumn and decay before the fruit is ripe. The spathe is greenish-white, about the size of a small apricot, abruptly acuminated into a compressed hornlike beak $1\frac{1}{2}$ to 2 inches long and a little turned over at the apex; the spathe splits round the base and is thrown off as the pedicels lengthen. Pedicels very numerous, unequal, the longest about 2 inches long, disposed so as to form a globose umbel. Perianth leaves ovate-oblong, about $\frac{1}{4}$ inch long, white, tinged with pink towards the apex, scabrous on the keel and on the margins. Anthers yellow. Capsules about the size of sweet-pea seeds, very bluntly trigonous. Seeds shaped like one of the divisions of an orange, rough, black.

Var. β differs from the preceding solely in having numerous bulbules at the base of the pedicels, which are compacted together in a ball ultimately about the size of a small nutmeg, the largest bulbules attaining the size of peas.

Var. γ is usually a smaller plant than vars α and β, at least when cultivated side by side of them, but differs only in the flowers being far fewer, much more tinged with rose-colour, and the peduncles of some of them often much longer than the others, and bearing a bulbule as well as several flowers at the apex (these branched peduncles, however, are often not present), and at the base of the peduncles there are a large number of bulbules, which at length are compacted into a ball from the size of a greengage plum to that of an apricot, the largest bulbules attaining nearly the size of a hazel-nut. The spathe sometimes splits round the base and falls off as in vars. α and β, but it is often ruptured longitudinally by the head-bulbules increasing in size before the spathe is ready to drop.

I have for some years cultivated the three forms above mentioned, and cannot believe them to be distinct, even as subspecies. The presence or absence of head-bulbules, and their number, is liable to great variation in many species of the genus Allium; and I am inclined to believe that bulbiferous plants are produced by head-bulbules, and capsuliferous examples from seeds; but in the present species I have never been able to obtain ripe seeds of A. Babingtonii with which to experiment.

My living plants of var. α were originally obtained from Mr. Borrer from Steep Holmes; those of var. β were raised from the head-bulbules of a dried specimen, gathered by Mr. F. A. Hanbury from the Artillery Barracks, Guernsey, in 1862; those of var. Babingtonii, from roots and head-bulbules of recent specimens kindly sent from Great Arran Island by Dr. Perceval Wright, and from head-bulbules from Besington, Dorset, from a dried specimen collected by Mr. I. C. Mansel; and also from Poltesco, Lizard, Cornwall, from a dried specimen sent by Mr. T. B. Flower.

Wild Leek.

French, *Ail poireau.* German, *Runder Lauch.*

The Leek is eaten as a potherb in Great Britain, as well as the garlic and onion. The Welsh and the Scotch are alike fond of these herbs. No reader of Walter Scott will forget the partiality of King Jamie for "cock-a-leekie." In the "Royal Apophthegms" of James I., it is asserted that the "Welsh men, in commemoration of the great fight by the Black Prince of Wales, do wear Leeks as their chosen ensign;" and some lines from the Harleian MSS., quoted in Hone's "Every-Day Book," have been adduced in support of this view:—

"I like the Leeke above all herbes and flowres,
When first we wore the same the field was ours.
The Leeke is white and grene, whereby is ment
That Britaines are both stout and eminent.
Next to the lion and the unicorn,
The Leeke's the fairest emblym that is worn."

Shakespeare seems to favour this statement in his conversation between Fluellen and Henry V.:—

> "If your majesties is remembered of it, the Welshmen did good service in a garden where Leeks did grow, wearing Leeks in their Monmouth caps; which, your majesty knows, to this hour is an honourable padge of the service; and I do believe, your majesty takes no scorn to wear the Leek on Saint Tavy's Day.
>
> "KING HENRY. I wear it for a memorable honour;
> For I am Welsh, you know, good countryman."

There would, however, seem to be no reason for connecting the battle of Cressy (fought on August 26) with St. David's Day; nor would the Welshmen have worn leeks in their Monmouth caps unless the Leek had previously been considered the national emblem. The Welsh tradition is, we believe, that in a great battle with the Saxons, A.D. 519, the Welsh, who were victorious, had distinguished themselves by wearing Leeks in their caps, being commanded to do so by Dewi, afterwards canonised as St. David; on which account the Leek was ever after worn on the day dedicated to his memory. If this tradition were current in the days of the Black Prince, we may well believe that his Welsh followers drew auguries of success from being stationed "in a garden where leeks did grow," and eagerly placed them in their caps, even though St. David's day were past.

SPECIES II.—ALLIUM SCORDOPRASUM. *Linn.*

PLATE MDXXXII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXC. Figs. 1073 and 1074.
A. arenarium, *Linn.* *Sm.* Engl. Fl. Vol. II. p. 134 (non Engl. Bot. Tab. 1358).

Bulb at the time of flowering consisting of a single large dark purple offset at one side of the flowering stem (or rarely of 2, one on each side of the stem), and producing a number of ovate-ovoid long-stalked purple bulbules about the size of peppercorns, slightly acuminated at each end. Leaves not fistulose, all sheathing the scape from its base to about its middle, broadly linear, folded, glaucous, scabrous on the edges and midrib, the apex hooded when young. Scape cylindrical. Spathe 2-valved ovate-ovoid, scarious, gradually acuminated into a conical subherbaceous beak shorter than the spathe. Flowers in a lax globose umbel, always intermixed with head-bulbules. Perianth leaves connivent, with a subscabrous keel on the outside of the 3 exterior ones. Stamens subincluded, the 3 interior filaments 3-cuspidate, with the antheriferous cusp about half as long as the undivided part, and the lateral cusps about as long as the latter. Capsule . . . . . ? Head-bulbules always present, dark purple, ovate-subglobular.

In sandy and gravelly pastures and thickets. Local. It occurs in the counties of York, Lancaster, and thence north to Kirkcudbright and Berwick-upon-Tweed. It again occurs in the south of Fife from Culross to Donibristle, and has been reported from Forfar and Moray, but from the latter county as an introduced plant. In

Ireland it is very local, and confined to the counties of Kerry and Cork.

England, Scotland, Ireland. Perennial. Late Summer, Autumn.

Root flowering when about the size of a filbert, and rarely exceeding that of a nutmeg, the outermost coat brownish, the rest white, the large offset and the small bulbules dark dull purple, the latter acuminated at each end. Stem not thicker than a swanquill, and often less, 2 to 3 feet high or more. Leaves similar to those of A. Ampeloprasum, but shorter and much narrower ($\frac{1}{2}$ to $\frac{3}{4}$ inch wide), and less closely folded together when young, appearing at the close of autumn. Spathe, including the beak, about 1 inch long, the latter about $\frac{1}{4}$ inch, and much less compressed than in A. Ampeloprasum. Flowers variable in number, the number being inversely as the number of head-bulbules. Perianth about $\frac{1}{4}$ inch long, less swollen at the base than that of A. Ampeloprasum, and of a much darker purplish-rose-colour. Anthers purple. Head-bulbules dark dull purple. The capsule I have not seen; for, though I have cultivated the plant for some years, the fruit has never ripened.

My living specimens were obtained from Thirsk, sent by Mr. J. G. Baker, and from Mr. H. C. Watson.

Linnæus appears, under the name of A. arenarium, to have included a small form of his A. Scordoprasum, and a large one of A. vineale. His description and herbarium specimens belong to the former plant; but, according to Fries, all the stations which he gives for his A. arenarium yield only A. vineale.

Sand Leek.

French, *Ail rocambole.* German, *Schlangenlauch.*

SPECIES III.—ALLIUM SPHÆROCEPHALON. *Linn.*

PLATE MDXXXIII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXCII. Fig. 1080.
Billot, Fl. Gall. et Germ. Exsicc. No. 2542.
A. Deseglisii, *Boreau*, Fl. du Centre de la Fr. ed. iii. Vol. II. p. 629 (?).

Bulb at the time of flowering consisting of a single large white offset on one side of the flowering stem, and producing several half-ovate trigonous long-stalked white bulbules about the size of currants, which are abruptly acuminated at the base, and longly acuminate-beaked at the apex. Leaves fistulose, all sheathing the scape from the base to below the middle, terete, more or less channelled or flattened above, dark green, slightly glaucous, with numerous more or less scabrous ribs. Scape cylindrical. Spathe 2-valved, ovate-subglobular, scarious, abruptly acuminated into a very short conical membranous beak much shorter than the rest of the spathe. Flowers very numerous, in a dense globose or shortly ovoid umbel, never intermingled with head-bulbules. Perianth leaves connivent, with a subscabrous or smooth keel. Stamens exserted, nearly half as long again as the perianth, the 3 interior filaments 3-cuspidate, with the antheriferous cusp usually nearly as long as the undivided part, but sometimes shorter, and the lateral cusps usually shorter than the central one. Capsule ovate-subglobose, bluntly trigonous. Seeds 2 in each cell.

On sands in St. Aubin's Bay, Jersey. Once plentiful, but now becoming scarce from building being carried on. Formerly on ledges of St. Vincent's Rocks, Gloucester; but Mr. T. B. Flower tells me it has disappeared from quarrying operations.

England (extinct). Channel Islands. Perennial.
Late Summer.

Bulb flowering when about the size of a cherry-stone, and rarely larger than a small nutmeg, enclosed in thin white coats enveloping the unequally-stalked bulbules which project above the chief offset like bunions on the base of the stem: sometimes the outermost coat of the bulb is fuscous. Stem 9 inches to 3 feet high. Leaves 6 inches to 1 foot long, appearing at the close of autumn and decaying before the fruit is ripe, from the thickness of a crowquill to that of a swanquill at the base, more or less flattened or channelled above. at first with the ribs rough, but afterwards these become nearly smooth. Spathe generally tinged with purple, especially towards the apex. Umbel with very numerous close flowers; pedicels spreading in all directions, slender, $\frac{1}{4}$ to 1 inch long; the upper ones frequently longer, so that the umbel becomes ovoid; all erect and rather stiff in fruit. Perianth bright dark purplish-red; the leaves about $\frac{1}{6}$ inch long, elliptical-oblong, obtuse, the three outer sometimes subapiculate. Anthers dark purple. Capsule about the size of a large hemp-seed, with three very blunt angles. Seeds shaped like one of the divisions of an orange, black, rugose.

I have both the Jersey and St. Vincent's Rock plants in cultivation, from roots received from Mr. T. B. Flower; and judging from these, I have come to the conclusion that there is no constancy in the leaf being channelled above or not. In weak plants the leaf has scarcely any channel, in stronger the channel is very apparent, and in very luxuriant examples the channel flattens out, so that the upper side of the leaf is nearly flat. I therefore, at present, see no reason to believe that A. Deseglisii is a distinct species or even subspecies.

Round-headed Garlic.

French, *Ail à tête ronde.* German [illegible]

SPECIES IV.—ALLIUM VINEALE. *Linn.*

PLATE MDXXXIV.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXC. Fig. 1075.
Billot, Fl. Gall. et Germ. Exsicc. No. 3222.

Bulb at the time of flowering consisting of a single large white offset on one side of the flowering stem, and producing a few half-ovate trigonous shortly stalked white bulbules about the size of currants, which are acuminated at the base, shortly acuminate, beaked at the apex. Leaves fistulose, all sheathing the stem from the base to about the middle or a little above it, terete, more or less channelled or flattened above, dull green, glaucous, with numerous nearly smooth ribs. Scape cylindrical. Spathe 1-valved, scarious, subglobular, abruptly acuminated into a rather long conical subherbaceous beak usually exceeding the rest of the spathe. Flowers usually few, in a lax hemispherical umbel, almost always intermingled with, and often entirely replaced by head-bulbules. Perianth leaves connivent, with a smooth keel. Stamens slightly exserted, scarcely one-fourth longer than the perianth; the 3 interior filaments 3-cuspidate, with the antheriferous cusp nearly as long as the undivided part, and the lateral cusps shorter than the central one. Capsule ovate-subglobose, bluntly trigonous. Seeds 2 in each cell. Head-bulbules oblong-elliptical, acuminated, often incurved, about the size of barleycorns.

Var. α, *capsuliferum.*

Flowers without head-bulbules. Perianth segments more or less stained with rose-colour.

Var. β, *bulbiferum.*

PLATE MDXXXIV.

Flowers intermixed with head-bulbules. Perianth white tinged with olive; the midrib alone rose-colour.

Var. γ, *compactum.*

A. compactum, *Thuill.* Fl. Par. p. 167.

Umbels without flowers, but with very numerous head-bulbules: frequently there are 2 or 3 heads formed solely of bulbules growing together at the apex of the stem.

Var. α in dry sand; very rare; I have it from St. Aubin's Bay, Jersey, collected by the Rev. W. W. Newbould in 1842, and again by Mr. H. C. Watson in 1852; I have also a single specimen from Deal sandhills. Var β in sandy places, but not very general; I have collected it about Southend, Gravesend, and on Deal sandhills. Var. γ is much the commonest form, and is found in pastures and waste places and banks; generally distributed in England; rather rare in Scotland, extending north to Lanark, Forfar, Fife, and Aberdeen. Local in Ireland, where it is confined to the south and east.

England, Scotland, Ireland. Perennial. Late Summer, Autumn.

Bulb flowering when about the size of a black currant, and rarely above that of a large filbert, with numerous tough fibrous coats, the inner ones white, the outer fuscous; the bulbules not placed above the bulb. Stem 9 inches to 3 feet high. Leaves very similar to those of A. sphærocephalon, but rather more fistulous, and of a duller and more glaucous green. Spathe (which does not split into 2 leaves) with a very much longer beak or point (½ to 1½ inch long); umbel of flowers much less globose, and the pedicels more enlarged below the flower, than in A. sphærocephalon. Perianth about ⅙ inch long, whitish, strongly tinged with rose-colour when there are no head-bulbules or when there are only 1 or 2; but very faintly tinged with rose and suffused with greenish in var. β, when there are numerous head-bulbules. Cusps of the filaments equal in the numerous flowers I have examined, but no doubt this varies, as the plant is usually described as having the anther-bearing cusp twice as long as the lateral ones. Capsule similar to that of A. sphærocephalon, but a little smaller, and with the 3 angles a little more prominent, the pedicels becoming quite erect in fruit as in that species. The head-bulbules, which are usually abundant in var. β, and completely replace the flowers in var. γ, are from ⅙ to ¼ inch long, in var. γ often commencing their growth before their fall, and sometimes even before the spathe is thrown off; the ball formed by the head-bulbules varies from the size of a black currant to that of a large cherry: these bulbules are usually green, but often tinged with brownish-purple towards the apex.

Crow Garlic.

French, *Ail des vignes.* German, *Weinbergs-Lauch.*

SECTION II.—CODONOPRASUM. *Koch.*

Destitute of a creeping rhizome. Bulbs solitary,* or subsolitary. Stem apparently leafy, from the leafsheaths surrounding it. Stamens more or less monadelphous; filaments all simple, subulate. Spathe with a long foliaceous split beak.

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* By "solitary" I mean that the offset bulbs do not produce a stem or leaves until they are detached from the parent bulb.

SPECIES V.—ALLIUM OLERACEUM. *Linn.*

PLATES MDXXXV. MDXXXVI.

Bulb at the time of flowering consisting of a single large white offset at one side of the flowering stem, destitute of bulbules, or with one or two sessile ones at the base. Leaves subfistulose or nearly solid, all sheathing the stem from the base to about the middle, semicylindrical, and channelled above, or linear and nearly flat (at least towards the apex), dull green, glaucous, with several scabrous ribs. Scape cylindrical. Spathe 2-valved, conical, subscarious, gradually acuminated into a very long beak with 2 unequal herbaceous leaflike points, one of which belongs to each valve of the spathe, the longer one many times exceeding the length of the spathe. Flowers usually few, in a lax umbrella-shaped umbel (from the long pedicels drooping while in flower), intermingled with head-bulbules. Perianth leaves subconnivent, combined into a bellshaped cup, obtuse, pale livid olive, streaked with red or dark olive. Stamens included, about as long as the perianth; filaments all simple and subulate. Capsule acutely triquetrous, with 3 narrow compressed lobes. Seeds 2 in each cell. Head-bulbules elliptical-fusiform, straight, about the size of grains of wheat, rarely absent.

Var. α, *genuinum.*

PLATE MDXXXV.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCLXXXVII. Fig. 1067.
Billot, Fl. Gall. et Germ. Exsicc. No. 1341.
A. oleraceum, *Sm.* Engl. Bot. ed. i. No. 488; and Engl. Fl. Vol. II. p. 136. *Boreau,* Fl. du Centre de la Fr. ed. iii. Vol. II. p. 630. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 207. *Reich.* Ic. l. c. p. 22.
A. oleraceum, var. angustifolium, *Koch,* Syn. Fl. Germ. et Helv. ed. ii. p. 831.

Leaves narrowly linear, semicylindrical, with a narrow channel above, indistinctly fistulose. Head-bulbules numerous.

Var. β, *complanatum.* *Fries.*

PLATE MDXXXVI.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCLXXXII. Fig. 1057; excl. flor. mag. sinistr.
A. complanatum, *Boreau,* Fl. du Centre de la Fr. ed. iii. Vol. II. p. 630. *Gren. & Godr* Fl. de Fr. Vol. III. p. 207.
A. carinatum, *Sm.* Engl. Bot. ed. i. No. 1658. *Reich.* Ic. l. c. p. 20, ex parte (non *Linn.*).

Leaves appearing in winter, broadly linear, very widely channelled at the base, flat towards the apex, nearly solid, with the upper and under surfaces parallel. Head-bulbules numerous.

In dry grassy places and on the borders of fields, hedgebanks, wall-tops, and rocks. Rather rare. Var. α I have from Devon, Somerset, and Gloucester. Var. β from Yorkshire, Forfar, and Kincardine. One or other of the forms has been recorded from Hants, Sussex, and Kent, north to Kincardine, Forfar, Fife, and Cumberland; but possibly in some of these localities A. vineale has been mistaken for it, and in Kincardineshire Dr. Dickie considers it an introduced plant.

England, Scotland. Perennial. Late Summer, Autumn.

Bulb flowering when about the size of a cherry-stone, and rarely larger than a sloe, generally solitary, occasionally producing small offsets or bulbules at the base, enveloped in whitish coats, the outer coat splitting into fibres especially at the base, and pale brown. Leaves variable in breadth, and generally speaking the broader they are, the more nearly parallel and the less separated are the upper and lower paginæ; but on cutting the leaf across isolated hollow canals may be perceived even in the broadest and flattest-leaved forms; on the underside there are prominent ribs which vary in number. The spathe is remarkable among the British species for its 2 very long foliaceous points, the longer one frequently 2 or 3 inches long, and quite resembling the leaves, but narrower. The 2 points of the spathe are united at the base, and sometimes the 2 valves of the spathe each carry one of these leaflike points when they separate; but it very frequently happens that the rapidly increasing size of the head-bulbules ruptures the spathe in another direction than that of the junction of the two leaves of which it is composed. The flowers vary much in number, sometimes there are only 5 or 6, at other times 30 or 40. The pedicels, which are very slender and erect in bud, hang over when the flowers expand, so that the latter droop, but they again become erect and stiff in fruit. Perianth about ¼ inch long, forming a wider bell than in any of the preceding species; the leaves of which it is composed are oblong, blunt, pale, suffused with olive, with a dull red or dark olive midrib; occasionally there is a rosy tinge on the flowers, which deepens when they are dried. The longer stamens are about equal to the perianth leaves, the yellow anthers just appearing beyond them. The capsule has 3 compressed keeled lobes enlarging upwards. The seeds are black and rugose, and shaped like those of most of the British species.

I have cultivated for some years the narrow-leaved plant, from roots sent me from Bristol from Mr. T. B. Flower, and from Plymouth, communicated by Mr. T. R. Archer Briggs, and beside these the broad-leaved form from Settle and Thirsk, from whence I have been favoured with roots by Mr. J. Tatham and Mr. J. G. Baker; and although I was at first inclined to think they were distinct subspecies, I am now convinced that they are merely varieties. All these four plants pass into each other, and lie between two plants received through M.

Lenormand from Professor Boreau, as his A. oleraceum and A. complanatum; the former has narrower and more fistulose leaves, the latter broader and flatter leaves than any of the British examples.

From the same source I received a plant under the name of A. paniculatum, from Angers. This I have no doubt is merely a wholly capsuliferous form of A. oleraceum. It is certainly not the A. paniculatum of most authors.

Reichenbach, in his "Icones," appears to have confounded A. oleraceum var. complanatum with the very distinct A. carinatum, *Linn.* His description and the main figure of his plate are unquestionably the former; but the detached flower with greatly exserted stamens has evidently been drawn from the true A. carinatum, which he figures under the name of violaceum on the same plate.

Field Garlic.

French, *Ail des lieux cultivés.* German, *Gemüse-Lauch.*

The Garlic used in cooking is not the native species, but one indigenous to the south of France and Sicily, and is known as *Allium sativum.* It was introduced in 1548, but appears to have been well known to the ancients, and formed a favourite dish among the Greeks and Romans. The tender leaves of the native species are often boiled in soups or fried with other herbs. Dr. Withering tells us that the smell of Garlic is so much disliked by moles, that to get rid of them it is sufficient to introduce a few heads of the plant into their subterranean holes.

SECTION III.—SCHŒNOPRASUM. *Auct.*

Destitute of an extensive creeping rhizome. Bulbs aggregated, rarely solitary, elongate. Stem apparently leafy, from the leafsheaths surrounding it, but frequently with only a single leaf, or sometimes leafless. Perianth segments connivent at the base, often recurved at the apex. Stamens more or less monadelphous, rarely free; filaments simple, subulate or the 3 interior dilated at the base, or rarely 3-cuspidate. Spathe with a very short non-foliaceous beak, 2-valved.

SPECIES VI.—**ALLIUM SCHŒNOPRASUM.** "*Linn.*" *Auct.*

PLATES MDXXXVII. MDXXXVIII.

Bulbs attached to a very short rhizome, aggregated by twos or threes, lanceolate-conical. Leaves terete, widely fistulose, dull green or glaucous, usually one or two of them sheathing the base of the stem; the barren bulbs with 1 to 4 leaves. Scape cylindrical. Spathe 2-valved, globose, scarious, coloured, abruptly acuminated into a very short conical apiculus. Flowers numerous, erect, in a dense hemispherical-turbinate umbel with short pedicels, destitute of head-bulbules. Perianth leaves connivent below, combined into a funnel-shaped bell, nearly straight or recurved at the apex when in flower, acute or subacute, pale purple. Stamens included, much shorter than the perianth; filaments all simple, subulate, monadelphous only at the very base. Capsule subglobular, very bluntly trigonous. Seeds 2 in each cell.

SUB-SPECIES I.—**Allium eu-Schœnoprasum.**

PLATE MDXXXVII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXCVI. Fig. 1085.
Billot, Fl. Gall. et Germ. Exsicc. No. 3223.
A. Schœnoprasum, *Linn.* *Sm.* Engl. Bot. ed. i. No. 2441. *Reich.* Ic. l.c. p. 25. *Fries*, Summ. Veg. Scand. p. 64. *Don*, Monog. p. 27. *Reich.* l. c. p. 25.
A. Schœnoprasum var. *a*, *Bab.* Man. Brit. Bot. ed. vi. p. 346. *Hook.* & *Arn.* Brit. Fl. ed. viii. p. 453. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 832.

Bulbs clustered, the barren ones with 2 to 5 leaves. Flowering stem naked, or with 1 leaf sheathing it below the middle. Leaves slender, straight, very slightly glaucous, with the ribs smooth or only faintly roughened. Perianth leaves gradually acuminate, slightly spreading at the tips.

On rocks along the basaltic dyke in Northumberland, by way of Walltown, Craig Lake, Kirkwhelpington and Bavington to Spindlestone; according to Hudson it was found in Westmoreland. In Scotland it is reported to have occurred at Fast Castle, Berwickshire; and near Inverkeithing, Fife; but, though I have searched these stations diligently, I have never been able to find it in either, so probably it has been a casual escape from cultivation. Stated by Lightfoot to grow in Argyleshire.

England, [Scotland]. Perennial. Summer.

Bulbs growing in dense tufts, with white rather firm sheaths, the outside sheath sometimes grey. Leaves appearing in early spring, nearly as long as the scapes, about the thickness of a crowquill. Scapes hollow, 4 inches to 1 foot high, nearly erect. Spathe at first ovate-ovoid, acuminate, afterwards subglobose with a very short apiculus not deserving of the name of a beak, the whole more or less tinged with purple. Flowers numerous, in a very dense umbel, which is at first round-topped, but in fruit becomes slightly conical. Pedicels very slender, shorter than the flowers, lengthening but slightly in fruit. Perianth nearly ½ inch long, very pale purple with a darker keel, changing to rose-colour when dry. Filaments very slightly connected at the base, about half as long as the perianth leaves; anthers bluish-purple. Capsule a little larger than a hemp-seed, completely concealed within the connivent perianth segments, which are about twice its length. Seeds black, similar to those of the other British species.

Garden Chives.

French, *Ail civette.* German, *Schnittlauch.*

The leaves and tender shoots of this plant alone are used in cooking for flavouring soups and stews, or for salads. In England Chives are little known, but in Scotland they are found in every cottage garden; and in France, where the science of cookery is more regarded than with us, they are a commonly used vegetable, being milder and more delicate than onions.

SUB-SPECIES II.—**Allium Sibiricum.** "*Linn.*" *Fries.*

PLATE MDXXXVIII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXCVI. Fig. 1086.
Billot, Fl. Gall. et Germ. Exsicc. No. 1079.
A. Schœnoprasum var. Sibiricum, *Bab.* Man. Brit. Bot. ed. vi. p. 346. *Hook. & Arn.* Brit. Fl. ed. viii. p. 453.
A. arenarium, *Sm.* Engl. Bot. ed. i. No. 1358 (excl. descript.).
A. foliosum, *Clairon*, in *D. C.* Fl. Fr. Vol. III. p. 726.
A. Schœnoprasum β alpinum, *Gaud.* *Koch*, Syn. Fl. Germ. et Helv. p. 833; et *Auct. Plur.*

Bulbs forming small tufts or subsolitary, the barren ones with a single leaf. Flowering stem with 1 to 3 leaves sheathing it up to about the middle. Leaves thick, often more or less recurved, glaucous, with the ribs scabrous. Perianth leaves rather abruptly acuminate and often subapiculate, recurved at the tips. Every part of the plant twice as large as in subspecies i., and the umbel more decidedly conical in fruit.

On rocks. Very local, and confined to the county of Cornwall, where it grows in plenty between Kynance Cove and Mullion, and also at Tintagel.

England. Perennial. Late Summer.

A larger and less cæspitose plant than A. eu-Schœnoprasum, and in the Cornwall form with the leaves remarkably recurved and the scape often curved at the apex. Leaves sometimes as thick as a goosequill, more glaucous and with much more scabrous ribs. The perianth a little larger and deeper coloured than in the preceding subspecies, with the tips of its leaves more reflexed. The scape is hollow only in the upper part, and the plant is a little later in flowering.

I am indebted to Mr. Charles Bailey for living roots collected by him in Cornwall, and I can confirm Mr. Borrer's statement in "English Botany Suppl.," No. 2934, that the plant comes up perfectly true from seed.

Greater Chives.

SECTION IV.—MOLIUM. *Don.*

Destitute of an elongated creeping rhizome. Bulbs subsolitary or more rarely aggregated, globular or elongate. Stem leafless, from the leafstalk not investing it for any distance above the surface of the ground (or very rarely with the base of the petiole sheathing it); occasionally the petiole or the upper portion of it is free and the lamina broad, and in all cases not fistulose. Perianth leaves often spreading, more rarely connivent in a wide cup or funnelshaped bell. Filaments simple, subulate, not monadelphous, entire. Spathe 1- or 2-valved, without a foliaceous beak.

SPECIES VII.—**ALLIUM TRIQUETRUM.** *Linn.*

PLATE MDXXXIX.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. DIII. Fig. 1101.
Billot, Fl. Gall. et Germ. Exsicc. No. 862.

No rhizome; bulb at the time of flowering usually (?) solitary, consisting of a single large spherical offset at one side of the flowering stem, enclosed in a thick almost crustaceous opaque white coat, and producing at its base several globular bulbules about the size of currants. Leaves sheathing the stem only beneath the ground, without any distinct petiole above the sheath, linear, parallel-sided, channelled, sharply keeled, at length recurved, pale green. Scape triquetrous, naked. Spathe 2-valved, lanceolate-fusiform, gradually acuminated towards the apex, wholly scarious. Flowers rather few, drooping in a lax somewhat unilateral umbrella-shaped umbel with long pedicels, destitute of head-bulbules. Perianth leaves connivent below, combined into a funnelshaped bell, recurved at the apex when in flower, strap-shaped-oblong, subacute, white with a green midrib. Stamens included, much shorter than the perianth; filaments all simple, linear, adhering to the bases of the perianth segments. Capsule about as long as broad, bluntly trigonous. Seeds 2 in each cell.

On hedgebanks and in meadows. Apparently confined to the island of Guernsey, where it is said to be not uncommon in damp shady situations, in the parishes of Câtel Forest and St. Martin. The only place where I observed it in the island was in a hedge at the north end of Vazon Bay, near the station for Centaurea aspera. Specimens were sent to the Botanical Society of London by the late Mr. J. Banker of Devonport, with the locality "Isle of Dogs, May, 1852;" but if it really occurred there, it must have been casually introduced, as no one else has been able to find it, and it is too conspicuous a plant to be overlooked.

Channel Islands. Perennial. Early Summer.

Bulb flowering when about the size of a black currant, and rarely larger than a cherry, deeply buried, producing numerous bulbules at the base, some of which are sessile, some stalked. These bulbules, as far as I have observed, never produce leaves till the succeeding year, when they have become quite detached from the parent bulb; but Professor Babington, in "English Botany," describes the rootstock as "supporting a small cluster of white subglobose bulbs, about as large as hazel-nuts, with a few stalked offsets of similar shape;" and M. Grenier, in the "Flore de France," says, "Bulbes souvent fasciculées." Leaves solitary on the barren bulbs, 2 to 4 at the base of the flowering stems, about 1 foot long by ½ inch broad, often rolled up at the apex, unless protected from frost during the winter, at the beginning of which they appear above ground; before the fruit is ripe they are completely decayed. Scape 9 to 18 inches high, slightly arching while in flower, but with the apex lying on the ground in fruit, with 3 sharp angles. Pedicels exceeding the perianth and equal to the scape, enlarged at the apex. Flowers 3 to 12, hanging to one side. Perianth segments ⅝ inch long, pure white, with a bright green midrib running nearly to the apex. Stamens about half as long as the perianth segments; anthers yellow. Capsule about the size of a small pea. Seeds rather large for the genus; the cotyledon remaining within the testa in germination, so that the first leaf comes up quite straight, not with a hook at the top as in all the preceding species.

I cultivated this plant for many years in the north suburbs of London, and found the leaves were often injured by frost; but the bulbs were never prevented from flowering, and the seed ripened very freely.

Triquetrous Garlic.

French, *Ail trigone.*

SPECIES VIII.—ALLIUM URSINUM. *Linn.*

PLATE MDXL.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. DVII. Fig. 1109
Billot, Fl. Gall. et Germ. Exsicc. No. 1340.

Bulbs attached to a very short rhizome, aggregated in twos or threes or solitary, each consisting of a single narrowly oblong-fusiform compressed offset, at one side of the flowerstalk; the barren bulbs with a single leaf, the fertile with 2 or 3; coats thin, white, the outermost one split into fibres; bulbules none. Petioles free except at the very base (where that of the outer leaf sheaths that of the inner leaf), semicircular, keeled; lamina elliptical or oblong-elliptical or oblanceolate-elliptical, flat, deep green. Scape triangular, almost triquetrous, naked. Spathe 2-valved, ovate-lanceolate, gradually acuminated towards the beak, wholly scarious. Flowers numerous, erect, in a lax flat-topped umbel with long pedicels, destitute of head-bulbules. Perianth leaves spreading, narrowly oblong-elliptical, subacute, wholly white. Stamens included, much shorter than the perianth; filaments all simple, linear, all adhering to the bases of the perianth segments. Capsule scarcely as long as broad, turbinate, deeply 3-lobed, with obtuse lobes. Seeds 1 (rarely 2) in each cell, subglobose.

On hedgebanks and in woods, copses, etc., and in damp pastures. Rather common, and generally distributed. Rare in the north of Scotland, and not reaching the most northern counties. Not unfrequent, and generally distributed in Ireland.

England, Scotland, Ireland. Perennial. Early Summer.

Bulbs 1 to 2 inches long by ¼ to ½ inch across. Leaves appearing in spring; petioles 3 to 10 inches long; lamina 2 to 8 inches long, by 1 to 4 inches broad. Scape 4 to 20 inches high. Pedicels ½ to 1¼ inch long. Perianth leaves about ½ inch long, spreading like a star while in flower. Stamens two-thirds of the length of the perianth leaves. Capsule about the size of a sweet-pea seed, deeply indented at the apex. Seeds commonly reduced to 1 in each cell by the abortion of the second, in which case they are less compressed than when there are two.

The growth of A. ursinum is very similar to that of A. narcissiflorum of Villars (A. Pedemontanum, *Willd.*), which is frequently but improperly placed among the rhizomatous Allia. A. ursinum, A. Victorialis, and A. narcissiflorum, have all extremely short rhizomes, which, however, decay towards the base, so that the rootstocks never grow out into thick Iris-like rhizomes as in the Rhiziridea of Don. In all these three species the bulbs are elongated and surrounded by bristly fibres, sometimes solitary, but more often 2 or 3 attached to the apex of the rhizomes: they ought either to form a separate group or be placed in Scordon of Koch.

Ramsons.

French, *Ail des ours*. German, *Bärenlauch*

Dr. Prior gives us the origin of the common name of this plant thus: "From the Danish and Swedish *ram*, rank, so called from its strong odour. Ramson would be the plural of *ramse*, as peason of pease, and oxen of ox. The appearance of this plant before the blossoms appear is so like that of the lily of the valley, that many persons have mistaken one for the other, and have only been undeceived by the overpowering smell of onions which the leaves emit. This plant is much prized by the Russians, especially in Kamtchatka, where it grows in large quantities; it is used both as an ingredient in food and as a remedy for scurvy, for which even in its worst form it is considered a certain cure. An old couplet records the estimation in which it was held by our forefathers :—

> "Eat leeks in Lide, and Ramsons in May,
> And all the year after physicians may play."

TRIBE III.—ANTHERICEÆ.

Perianth leaves free or coherent at the base. Seeds globular or triquetrous, with the testa commonly black.

Rootstock not bulbous, producing fasciculated fibres. Leaves all radical, or on a leafy stem, commonly linear.

GENUS XVI.—**SIMETHIS.** *Kunth.*

Flowers perfect, jointed to the pedicel below the base. Perianth coloured, widely funnelshaped or funnelshaped-rotate; perianth leaves 6, free, except at the very base, deciduous, spreading, 5- to 7-nerved. Stamens 6, free from the base of the perianth leaves; filaments woolly in the lower half. Style filiform; stigma entire. Capsule subglobose, 3-lobed, loculicidally 3-valved, 3-celled. Seeds 2 in each cell of the ovary, one above the other, or (by abortion) only 1; testa black, furnished with an arillus.

An herb with a nonbulbous rootstock producing a tuft of fasciculated root-fibres. Leaves all radical, grasslike. Scape bearing a panicle with corymbose branches, furnished with leaflike bracts at the base of the lower branches of the panicle. Flowers white, purple on the outside.

This genus is named after Simæthis, a Sicilian nymph.

SPECIES I.—**SIMETHIS BICOLOR.** *Kunth.*

PLATE MDXLI.

Billot, Fl. Gall. et Germ. Exsicc. No. 1552.
S. planifolia, *Woods*, in Engl. Bot. Suppl. No. 2952. *Gren. & Godr.* Fl. de Fr. Vol. III. p. 222.
Morgagnia bicolor, *Buban.* *Parl.* Fl. Ital. Vol. II. p. 606.
Phalangium planifolium, *Pers.* Syn. Vol. I. p. 367.
P. bicolor, *D.C.* Fl. Fr. Vol. III. p. 209.
Anthericum planifolium, *Linn.* Mant. II. p. 224.
A. bicolor, *Desf.* Fl. Atl. Vol. I. p. 304.
Bulbine planifolia, *Röm. & Sch.* *Bert.* Fl. Ital. Vol. IV. p. 131.

The only known species.

On heaths near Bournemouth, Dorset, amongst firs. On Abbey

Island, Derrynane, and on the coast of the mainland a little to the west of Derrynane, co. Kerry.

England, Ireland. Perennial. Summer.

Rootstock short, emitting numerous thick fleshy fibres, the leaves and stems enclosed within broad subscarious sheaths, the outermost of which are split into numerous bristly fibres. Leaves linear, flat, acute, and often heeled at the apex, 2 inches to 1 foot or more long. Scape 6 to 18 inches high, irregularly dichotomously branched, so that the inflorescence forms a short panicle with corymbose branches. Bracts at the principal forks of the scape herbaceous; at the ultimates ones much smaller and scarious. Perianth leaves about $\frac{3}{5}$ inch long, spreading, oblong-elliptical inclining to oblanceolate, with 5 or 7 strong ribs at the centre, white within, purple on the outside in the middle. Anthers yellow. Capsules about the size of sweet-pea seeds. Seeds 2 in each cell, one above the other, semiglobose, half-obovate, black, shining, with an arillus at the base which is shrivelled when dry.

Of this plant I have seen only dried specimens.

Variegated Simethis.

TRIBE IV.—NARTHECEÆ.

Perianth leaves cohering at the base. Seeds filiform, with a bristle-like appendage at each end.

Herbs with slender creeping rhizomes emitting slender root-fibres. Leaves radical, ensiform-equitant, falcate, those on the stem bractlike.

GENUS XVII.—**NARTHECIUM.** *Huds.*

Flowers perfect, not articulated to the pedicel. Perianth coloured, rotate; perianth leaves 6, free, spreading, at length connivent, persistent, the outer leaves herbaceous on the back. Stamens 6, the 3 outer inserted in the base of the perianth segments; filaments woolly; anthers affixed by the back a little above the base, extrorse. Style subulate; stigma entire. Capsule pyramidal, loculicidally 3-valved, 3-celled, at least at the base. Seeds very numerous; testa slender, with a long appendage at each end.

An herb with a creeping slender rootstock and equitant-ensiform falcate-recurved striate leaves, which are mostly radical. Stem scapelike, terminated by a raceme of yellow flowers.

The only known species.

The name of this genus is derived from the Greek word *ναρθήκιον*, a chest or case for ointments, in reference to its supposed virtues.

SPECIES I.—NARTHECIUM OSSIFRAGUM. *Huds.*

PLATE MDXLII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXI.
Anthericum Ossifragum, *Linn.* Sp. Pl. p. 446.

The only known species.

On boggy heaths and spongy bogs. Not uncommon, and generally distributed.

England, Scotland, Ireland. Perennial. Late Summer, Autumn.

Rootstock extensively creeping, slender, emitting dense tufts of root-fibres, and at intervals leaf-tufts and flowering stems, the two latter enveloped at the base by scarious sheaths and the fibrous remains of decayed leaves and sheaths. Leaves linear-ensiform, commonly slightly falcate, 2 to 18 inches long, pale green, with several very strong ribs. Flowering stem 4 to 18 inches high, without falcate leaves at the base, with several minute bractlike leaves with scarious margins, the lower stem-leaves with completely sheathing bases, the upper ones semi-amplexicaul. Raceme 1 to 4 inches high. Pedicels spreading in flower, erect in fruit, with a bract at the base, and often a bracteole above the middle. Perianth leaves spreading in flower, connivent in fruit, about $\frac{1}{4}$ inch long, lanceolate-strapshaped, yellow, greenish on the middle of the back, where there are 3 or 5 strong ribs. Anthers orange-scarlet. Capsule longer than the perianth leaves, about $\frac{3}{8}$ inch, slender, much acuminated at the apex, brick red. Seeds very minute, with an elongated tail at each extremity.

N. Americanum is evidently only a subspecies having the leaves narrower than the European plant, and the flowers and capsule smaller.

Lancashire Asphodel.

French, *Narthécie des marais.* German, *Gemeines Beinheil.*

This little plant is common on wet moors and the boggy sides of hills. Since sheep pasturing in such localities are liable to the rot, it was formerly thought that this disease was attributable to the herbage on which they fed; and hence this innoxious plant received the ill-omened name *ossifragum*, or "bone-breaker."

SUB-ORDER IV.—MELANTHEÆ.

Leaves of the perianth free or combined, usually all similar and petaloid or herbaceous. Styles free. Fruit a dry capsule, septicidally 3-valved.

Herbs with the root of fasciculated fibres; the rootstock rarely a bulb or oblique-based corm. Stems simple, rarely branched or nearly absent. Leaves parallel-veined, sometimes equitant and ensiform.

TRIBE I.—VERATREÆ.

Perianth leaves free or sessile or with short claws, cohering at the base, and forming a short tube.

Rootstock not cormose. Root-fibres often fasciculate. Stems often leafy.

GENUS XVIII.—TOFIELDIA. *Huds.*

Involucre calyxlike, 3-cleft. Flowers perfect, not articulated to the pedicel. Perianth coloured, widely funnelshaped or subrotate; perianth leaves 6, free, sessile, more or less spreading, subpersistent. Stamens 6, inserted on the base of the perianth segments; filaments filiform; anthers affixed by the back and versatile. Styles 3, short; stigmas capitate. Capsule 3-cleft, 3-lobed, septicidally 3-valved. Seeds numerous, linear.

Herbs with creeping slender rootstocks and equitant-ensiform falcate-recurved striate leaves which are mostly radical. Stem scapelike, terminated by a raceme of small white or greenish-white flowers in a spikelike raceme or spike.

This genus was named in honour of a Mr. Tofield, a Yorkshire botanist and patron of the science.

SPECIES I.—TOFIELDIA PALUSTRIS. *Huds.*

PLATE MDXLIII.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXX. Figs. 934, 935.
T. borealis, *Wahl.* *Fries*, Summ. Veg. Scand. p. 65. *Koch*, Syn. Fl. Germ. et Helv. ed. ii. p. 837. *Reich.* Ic. l. c. p. 1.
Anthoricum calyculatum, *Linn.* Sp. Pl. p. 447.

Stem glabrous, nearly leafless. Leaves 3- to 5-nerved. Pedicels with a 3-lobed bract at the base, but no bracteoles at the apex. Perianth leaves oblanceolate-oblong, yellowish-white tinged with yellowish-green on the back.

In wet places and by the sides of rills on mountains. Rather local. In England it is confined to Teesdale, both on the Yorkshire and Durham sides of the stream. Not uncommon in the Scotch Highlands, extending north to Sutherland.

England, Scotland. Perennial. Summer.

Rootstock shortly creeping, producing tufts of distichous linear-ensiform subfalcate striated leaves, 1 to 3 inches long, much resembling those of Narthecium Ossifragum in miniature. Flowering stem with a few similar leaves at the base, and occasionally a single bract-like leaf near the middle, 2 to 8 inches high, terminated by a dense spikelike raceme from $\frac{1}{4}$ to $\frac{3}{4}$ inch long in flower, and $\frac{1}{2}$ to 1 inch long in fruit, the lower flower often separated by a short interval from the others. Pedicels at first very short, but lengthening slightly in fruit, though never as long as the capsule. Bracts scarious, 3-lobed; the middle lobe triangular; the lateral lobes blunt, often truncate or notched. Perianth segments about $\frac{1}{10}$ inch long, somewhat spreading in flower, connivent in fruit. Capsule about the size of white mustard seed or a little larger, subglobular, 3-lobed, longer than the perianth segments, splitting at the septa into 3 valves, each one tipped by one of the short recurved styles. Seeds very minute, brown, rough, slightly shining, oval-oblong, half-ovoid-trigonous.

Reichenbach figures and Mr. Bentham describes what I have never seen in the British plant, a 2- or 3-lobed bracteole *within* the bract at the base of the pedicel. In all the very numerous specimens I have examined, the bracteoles are united to the sides of the bract, so that it appears to be a 3-lobed bract at the point where the pedicel joins the rachis

Scottish Asphodel.

French, *Tofieldie à collerette.* German, *Sumpf Tofieldie.*

TRIBE II.—COLCHICEÆ

Perianth leaves free, with very long claws, or with the claws cohering into a very long tube.

Rootstock an oblique-based corm, rarely a "bulb" (*Endlicher*).

GENUS XIX.—**COLCHICUM.** *Tournef.*

Perianth coloured, funnelshaped, with a very long slender tube and a 6-partite limb, withering. Stamens 6, inserted on the tube of the perianth; anthers affixed by the back, versatile. Styles 3, filiform, very long; stigmas slender. Capsule fusiform, 3-lobed, septicidally 3-valved. Seeds numerous, subglobose; testa brown, rugose.

Herbs with oblique-based corms contained in brown or dark brown coats. Flowers in most of the species appearing in autumn after the leaves have decayed; the leaves produced at the close of winter, and capsule coming above ground in the following spring. Flowers lilac or pink varying to white, resembling in form those of a Crocus.

This genus is so called on account of its being found in Colchis, a country of Asia, said to be full of poisons, and of this among the rest.

SPECIES I.—COLCHICUM AUTUMNALE. *Linn.*

PLATES MDXLIV. MDXLV.

Reich. Ic. Fl. Germ. et Helv. Vol. X. Tab. CCCCXXVI.
Billot, Fl. Gall. et Germ. Exsicc. No. 2540.

Leaves 3 to 4, ascending, erect, strapshaped-elliptical (the inner ones sometimes strapshaped), not undulated at the edges, appearing in early spring after the flowers and with the capsule. Flowers 1 to 3, rarely more, pinkish-lilac, not tesselated. Stigmas elongate, lateral.

In meadows. Local, and rather rare, though distributed over the greater part of England. Not native in Scotland, but said to be naturalised near Alloa, on the Forth, and in a deserted orchard at the foot of the Pentland Hills, eight or ten miles from Edinburgh. Very local and rare in Ireland, occurring about Kilkenny and near Carlow, the banks of Shannon below Limerick, and a few other places.

England, [Scotland,] Ireland. Perennial. Autumn (rarely retarded until Spring).

Corm flowering when the size of a small walnut; at the time of flowering nearly flat on one face, with a blunt raised ridge down the flat face, the other side very convex, the base sloped away down towards the flat side, the whole enveloped in a shining chestnut coat, on the outside of which there are opaque dark brown coats extending upwards nearly to the surface of the ground. Ovary buried at the time of flowering. Tube of the perianth 4 to 5 inches above the ground. Perianth segments 1½ to 1¾ inch long, oblong-elliptical; the inner segments rather smaller. Styles hooked at the apex, at first as long as the stamens, afterwards exceeding them. Anthers about ½ inch long, yellow. Leaves 6 inches to 1 foot long, deep dull green, slightly shining. Capsule 1½ to 1¾ inch long, deeply 3-lobed, transversely rugose, splitting at the apex along the septa. Seeds about the size of hemp-seed, globular, chestnut, roughened.

A remarkable form of Colchicum autumnale is figured at Plate MDXLV. Smith states that it was obtained by Mr. Salmon from a meadow near Devizes, Wilts, flowering in the months of April and May. The perianth segments are strapshaped, greenish-white, and the anthers destitute of pollen. It is a monstrosity rather than a variety, but so remarkable a one that it has been thought advisable to republish the plate.

Meadow Saffron.

French, *Colchique d'automne.* German, *Herbst Zeitlose.*

The bulb of this plant has long been valued in medicine. It was known to the Greek physicians as a poison, under the name of *κολχικόν*, but was little employed in medicine until so lately as 1763, when it was recommended at the same time with monkshood and other powerful vegetable drugs, by Baron Störck of

Vienna. Dioscorides describes it accurately, but only as a poison. In large doses it is an irritant poison; but carefully administered, it is a useful remedy in many diseases, and is retained in the "British Pharmacopœia." The seeds and bulb are the officinal parts, and are both indebted for their action to a peculiar alkaloid known to chemists as *colchicin.* Dr. Taylor records several instances of fatal poisoning by Colchicum, both by swallowing the seeds and by taking an overdose of the tincture by mistake. Dr. Christison considers Colchicum to be a powerful sedative of the circulation, and to this action, he says, "may probably be ascribed its well-known power of subduing the paroxysm of gout, and checking the progress of subacute or gouty rheumatism." It is to this power of arresting gout, established by the late Sir Everard Home, that Colchicum owes its extensive introduction into practice; but its effect on the system is such that many physicians object to its constant use. It increases the action of the kidneys, and acts as an aperient, relieving the excitement of the nervous system. The celebrated *eau médicinale*, which acquired great fame during the last century as a remedy for gout, owed its properties chiefly to this plant. The roots for medical use should be collected about Midsummer, after the leaves have withered, as they then possess more of their active qualities than at any other time. Large quantities are sent to the London herb shops from Gloucestershire and Oxfordshire, where its large purple blossoms may be seen covering the fields in the autumn months, like the crocus, but without the protection of leaves, which wither soon after the spring. The seeds should be gathered in May as soon as they are ripe. Dr. Lindley relates the case of a woman who was poisoned by the sprouts of Colchicum, which had been thrown away in Covent Garden Market, and which she mistook for onions. As the plant is as injurious to most animals as to man, it should be destroyed in fields, for cattle will sometimes crop the leaves in the spring.

EXCLUDED SPECIES.

SCILLA BIFOLIA. *Linn.*

Engl. Bot. ed. i. No. 24.

Said to have been sent to Mr. Sims of Norwich from the west of England. Smith says there is a specimen in Buddle's Herbarium; but the only recent instance of its occurrence in Britain was the finding of a few plants of it at Teignmouth, Devon, by Mrs. Gulson, who forwarded fresh specimens to Mr. G. Worthington Smith. At my request, Mr. Smith was good enough to apply to the lady for further information, and her reply was that she "found only a few specimens which she brought into her garden, and that the plant was not now to be found in the neighbourhood."

ALLIUM CARINATUM. *Linn.*

The Rev. M. J. Berkeley lately announced that this plant had occurred near Newark, and he was kind enough to send me a specimen and some living roots, which leave no doubt as to the correctness of the nomenclature. I applied to the finder, the Rev. W. S. Hampton, rector of Stubton, and he writes: "I found one good-sized patch of it in a lane in the parish of Doddington, next parish to my own. The roots were very close together. I should think the patch was not far from a yard square; I did not see any other patches. I should observe that the lane in question is at some distance from houses, and very little frequented; but whereas a great deal of the land round it is clay, the lane is very sandy, and the sides of the lane have been in many places dug out for the sand, and filled up again with soil from other places."

ALLIUM PARADOXUM. *Don.*

Found by Mr. Alexander Craig Christie in Binny Craig Woods, twelve miles west of Edinburgh; probably planted by Mrs. Stewart of Binny House. The Rev. B. Hislop also found a plant by the banks of the Water of Leith above Colinton. (See Trans. of Bot. Soc. Edin. vol. viii. p. 458.) Arniston Woods, Edinburgh. (Trans. Bot. Soc. Edin. vol. ix. p. 480.)

ALLIUM ROSEUM. *Linn.*

A. ambiguum, *Sibth. & Smith.* D. Don, in Engl. Bot. Suppl. No. 2803 (non. *D.C.*).

This plant formerly occurred on the shore of the Medway, a little above Rochester Bridge, where it was discovered by Mr. J. A. Hankey in 1837. A specimen from this station was figured by Don as quoted above. I found the plant in abundance in 1853, on the inner slope of the embankment which surrounds a small field which projects into the river Medway beneath Rochester Castle; but on revisiting the spot in 1866, the Allium had entirely disappeared. It is also said to have occurred on Eye Castle Hill, Suffolk.

ALLIUM NIGRUM. *Linn.*

Living roots of this were sent to me from a hedgebank at Sprowston, near Norwich, by the Rev. Kirby Trimmer, who states the plant has been known for fifty years in that locality. It is the A. Ampeloprasum of that gentleman's "Flora of Norfolk," page 144.

ALLIUM MOLY. *Linn.*

Naturalised in plantations at Low Wood, near Belfast. Mr. T. A. Steward, in Cyb. Hib. p. 297.

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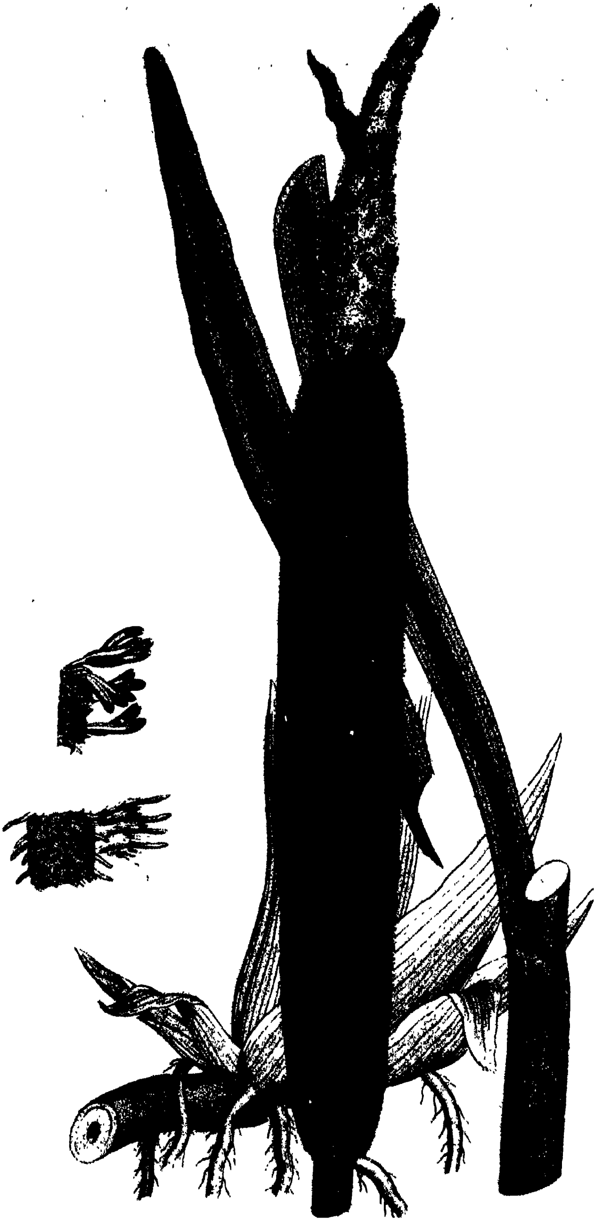
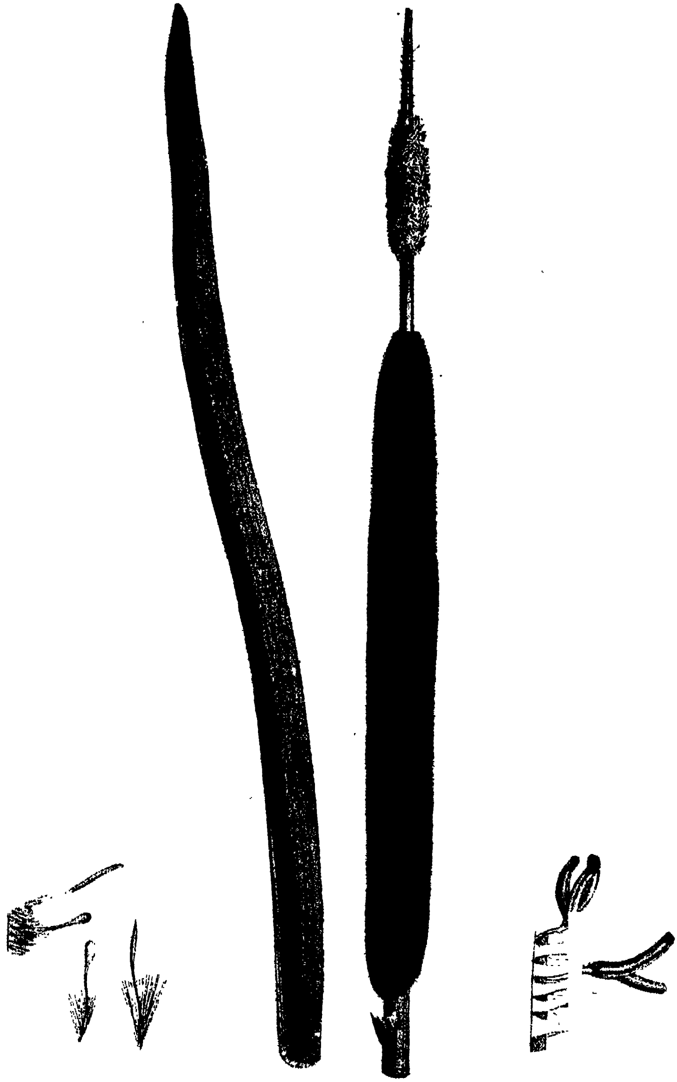
ILLUSTRATIONS.



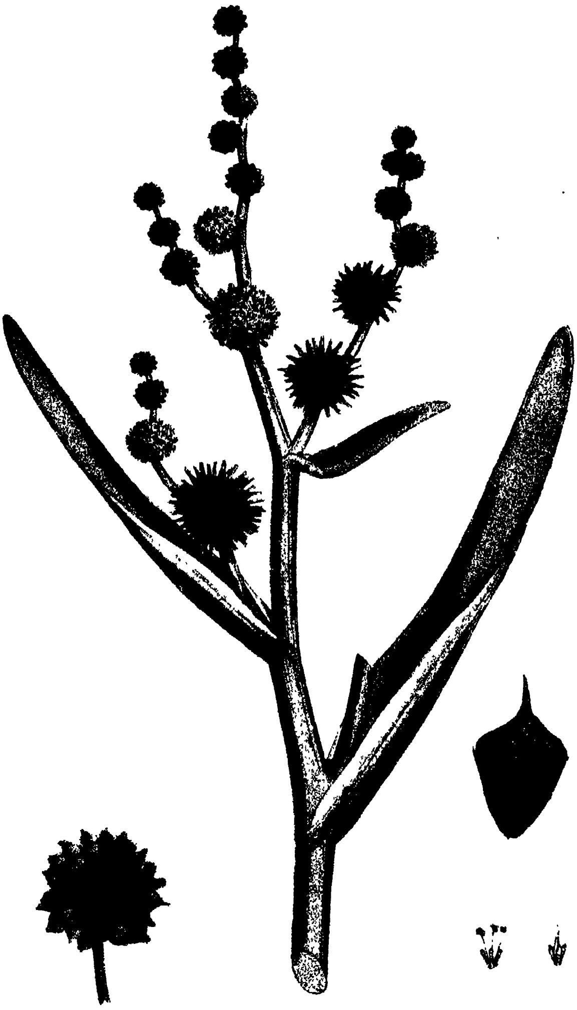
B. 1455.

Typha latifolia. Common Cat's-tail.



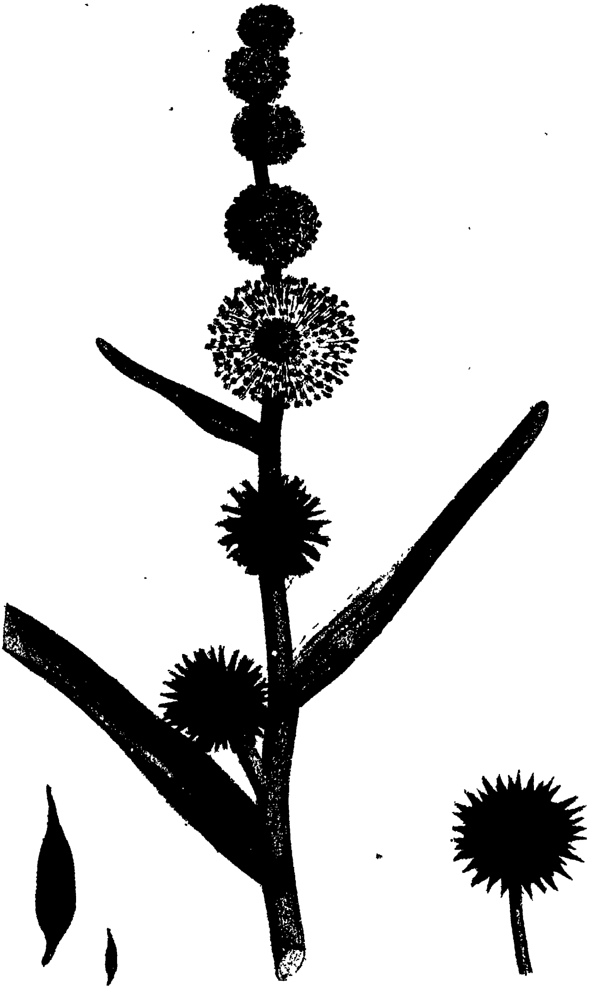
E. B. 1456.

Typha angustifolia. Narrow-leaved Cat's-tail.



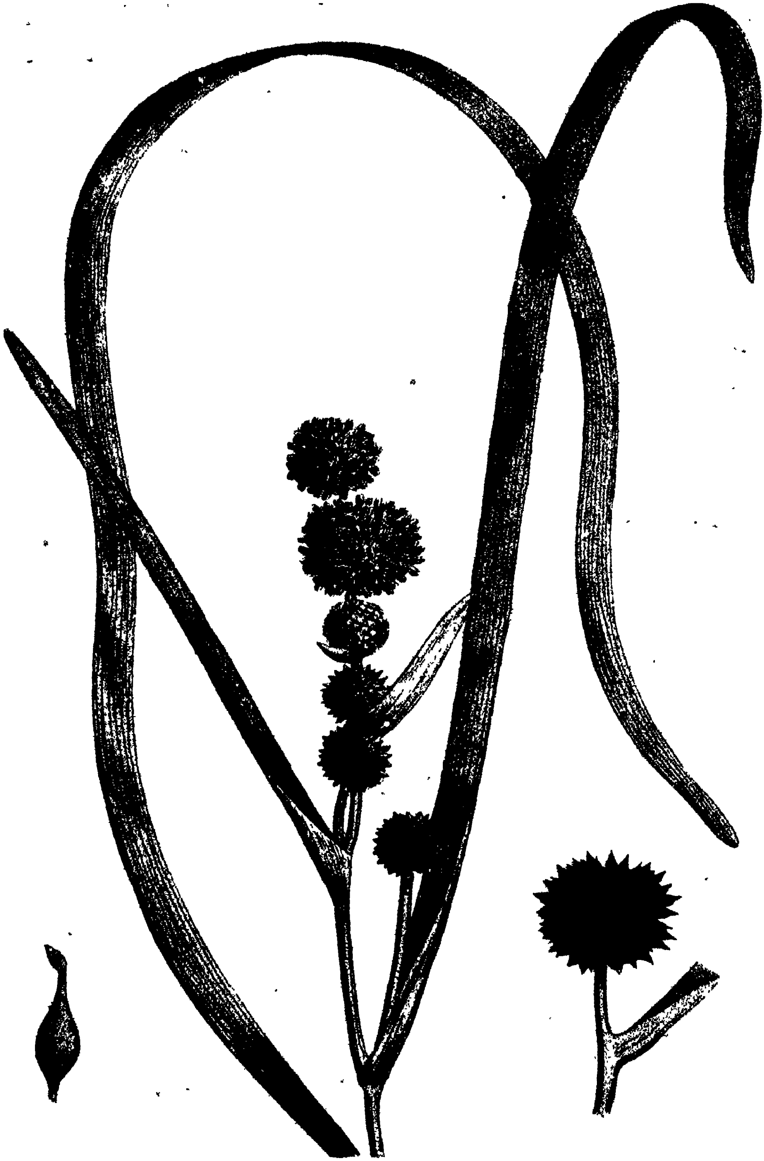
E. B. 744.

Sparganium ramosum. Branched Bur-reed.

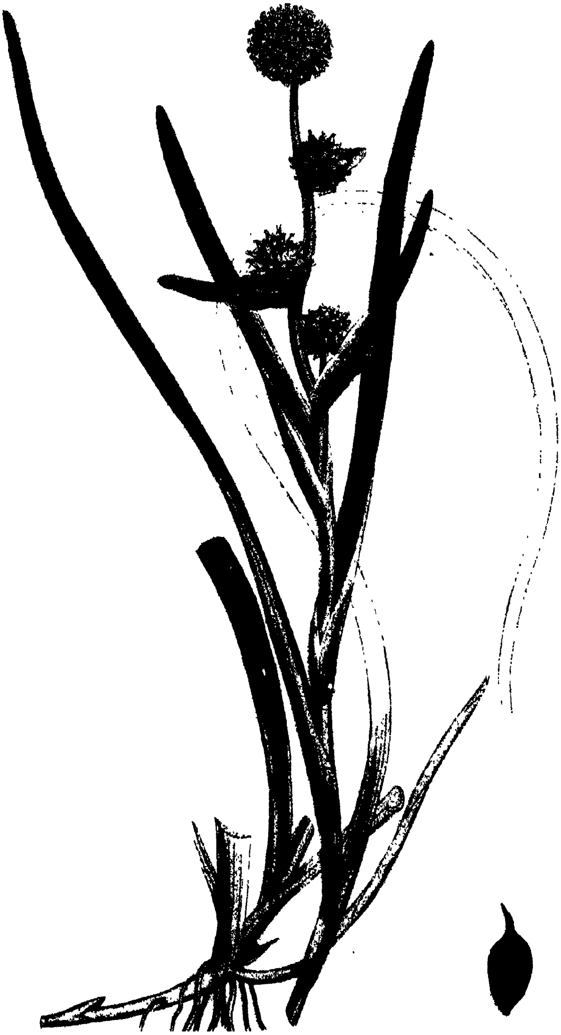


E. B. 745.

Sparganium simplex. Unbranched Bur-reed.

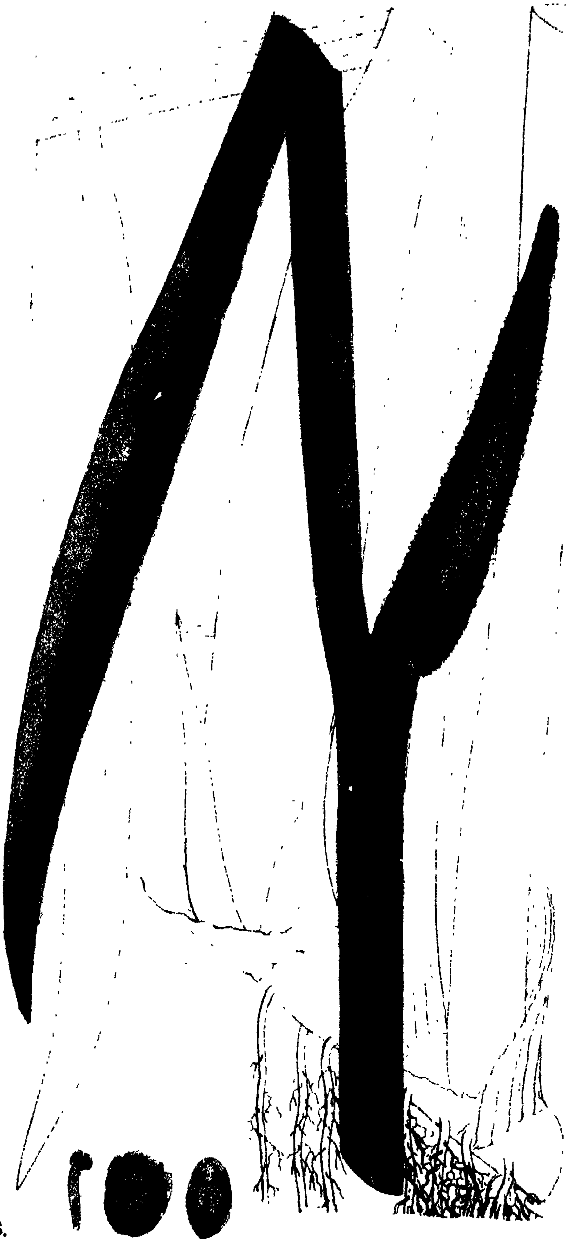


Sparganium affine. Floating Bur-reed.



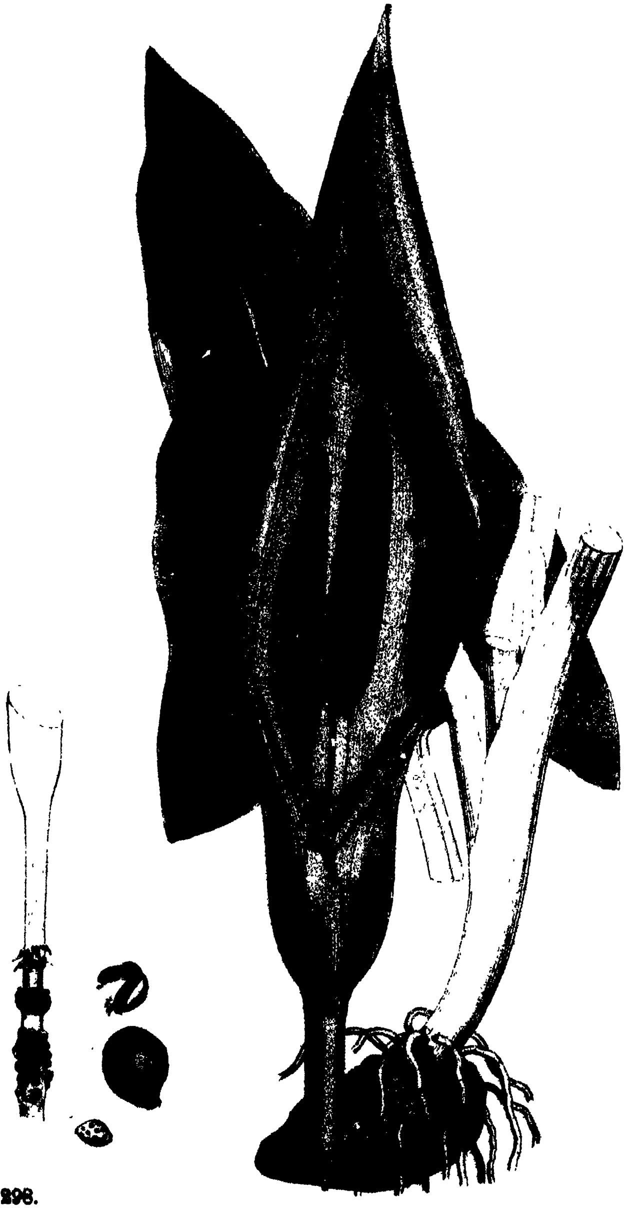
E. B. 273.

Sparganium minimum. Small Bur-reed



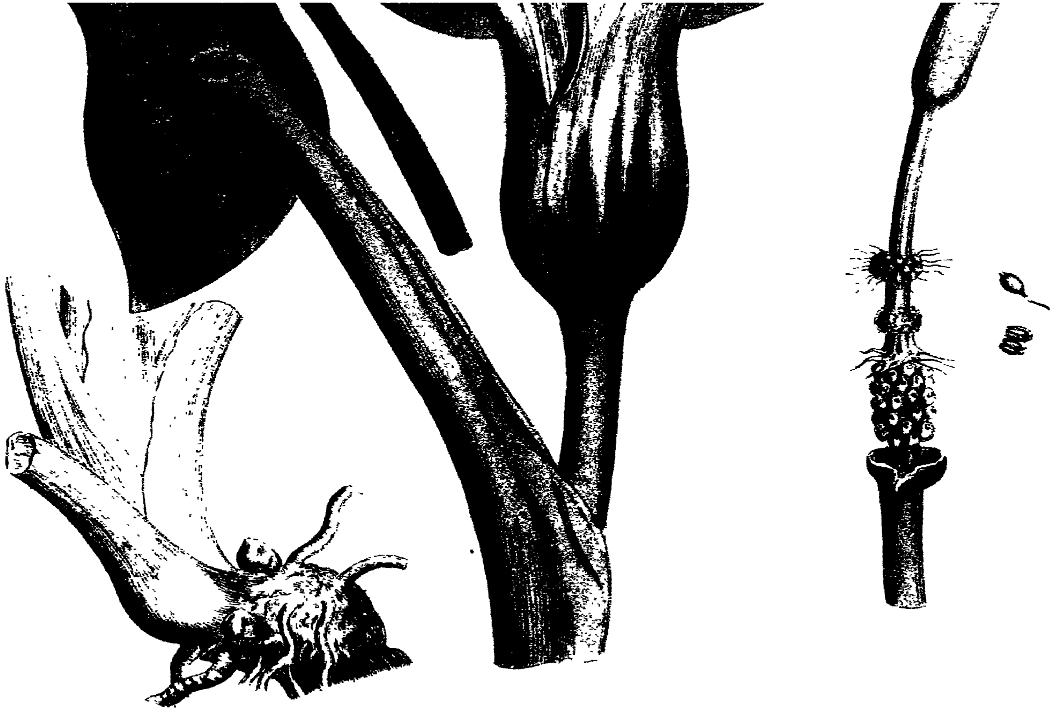
E. B. 356.

Acorus Calamus. Sweet-flag.



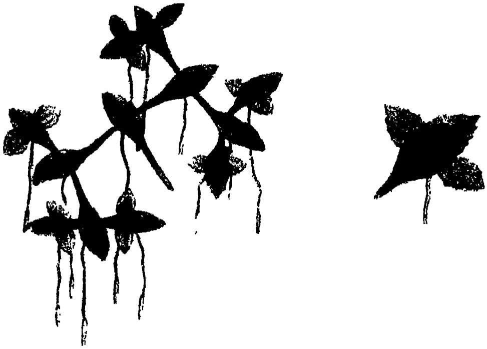
E. B. 1298.

Arum maculatum. Common Cuckow-pint.



Arum Italicum. Italian Cuckow-pint.

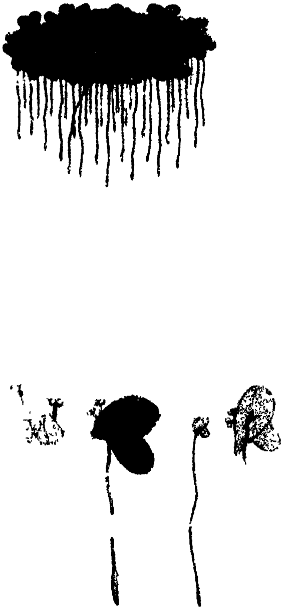
MCCCXCIV.



E. B. 926.

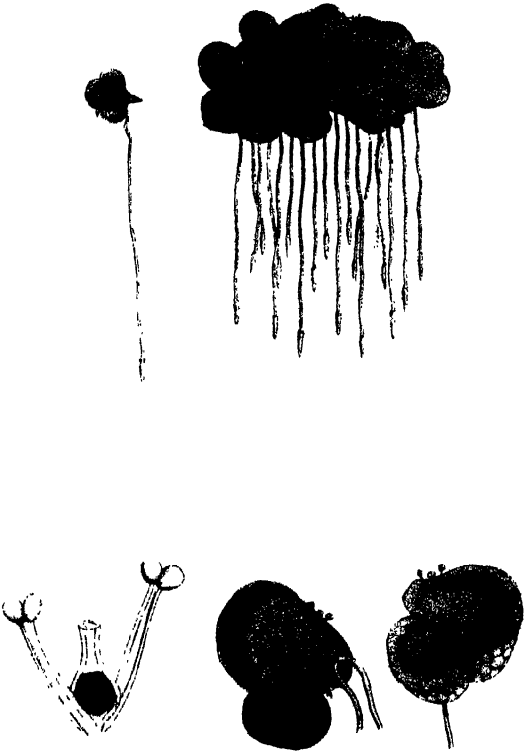
Lemna trisulca. Ivy-leaved Duckweed.

MCCCXCV.



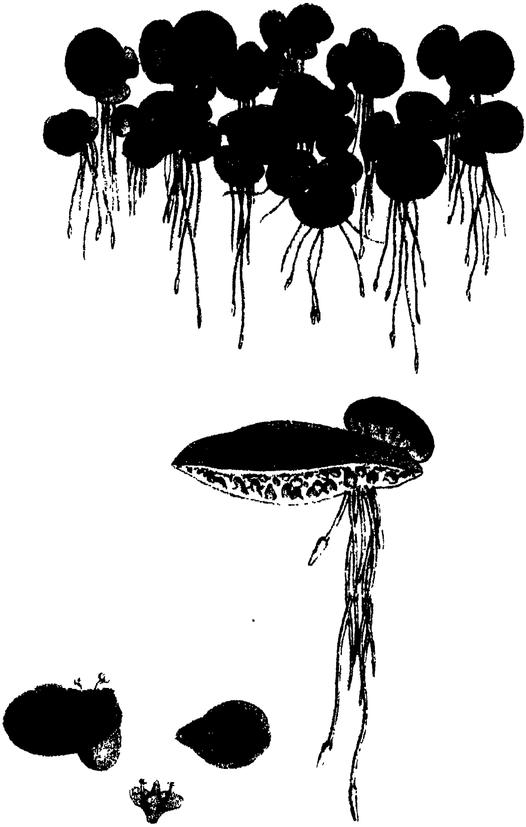
. 1095.

Lemna minor. Lesser Duckweed.



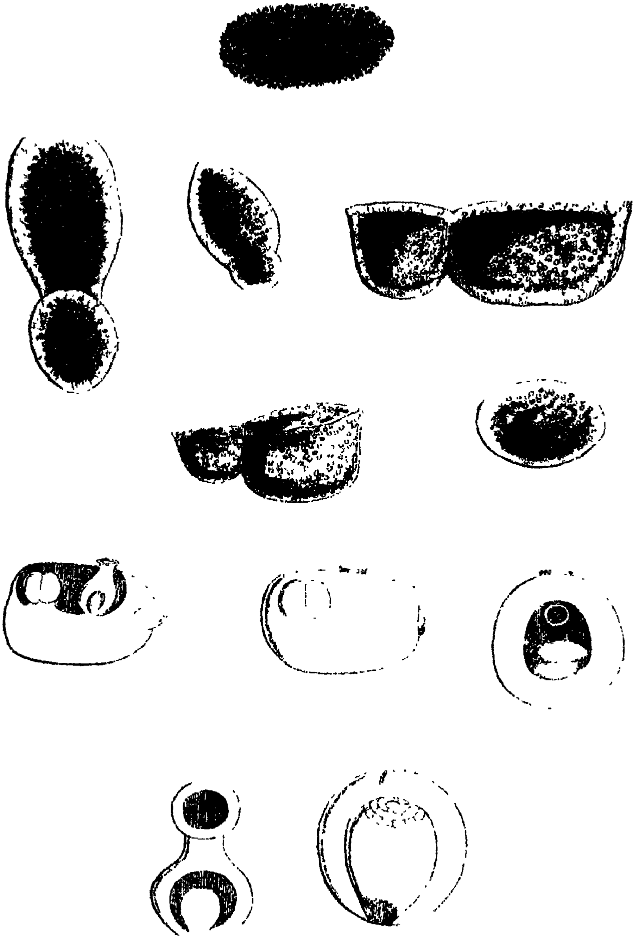
E. B. 1233.

Lemna gibba. Gibbous Duckweed.

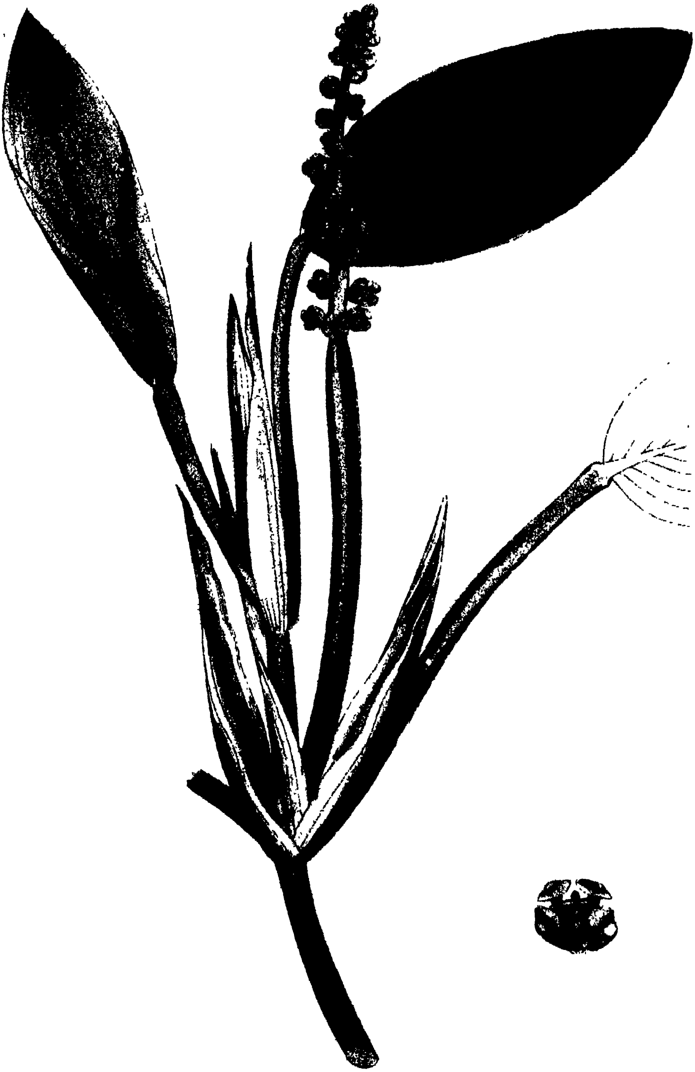


E B. 2458.

Lemna polyrrhiza. Greater Duckweed.

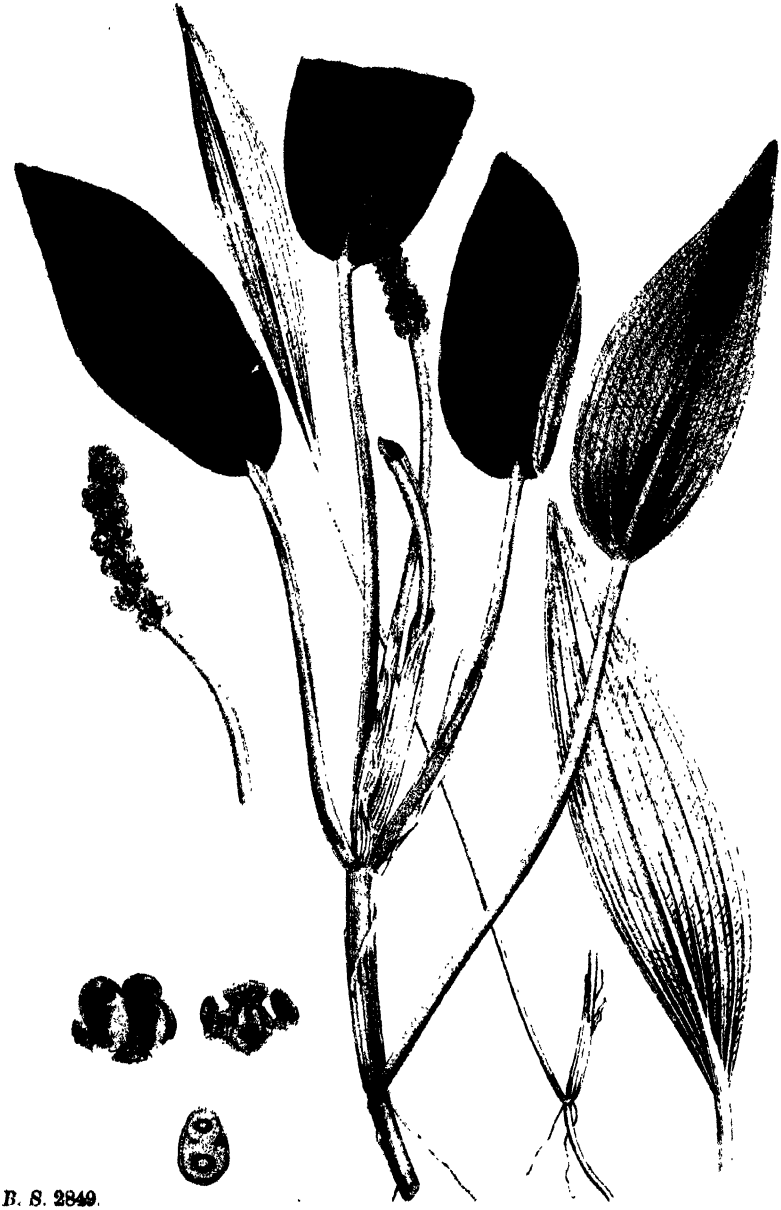


Lemna arrhiza. Rootless Duckweed.



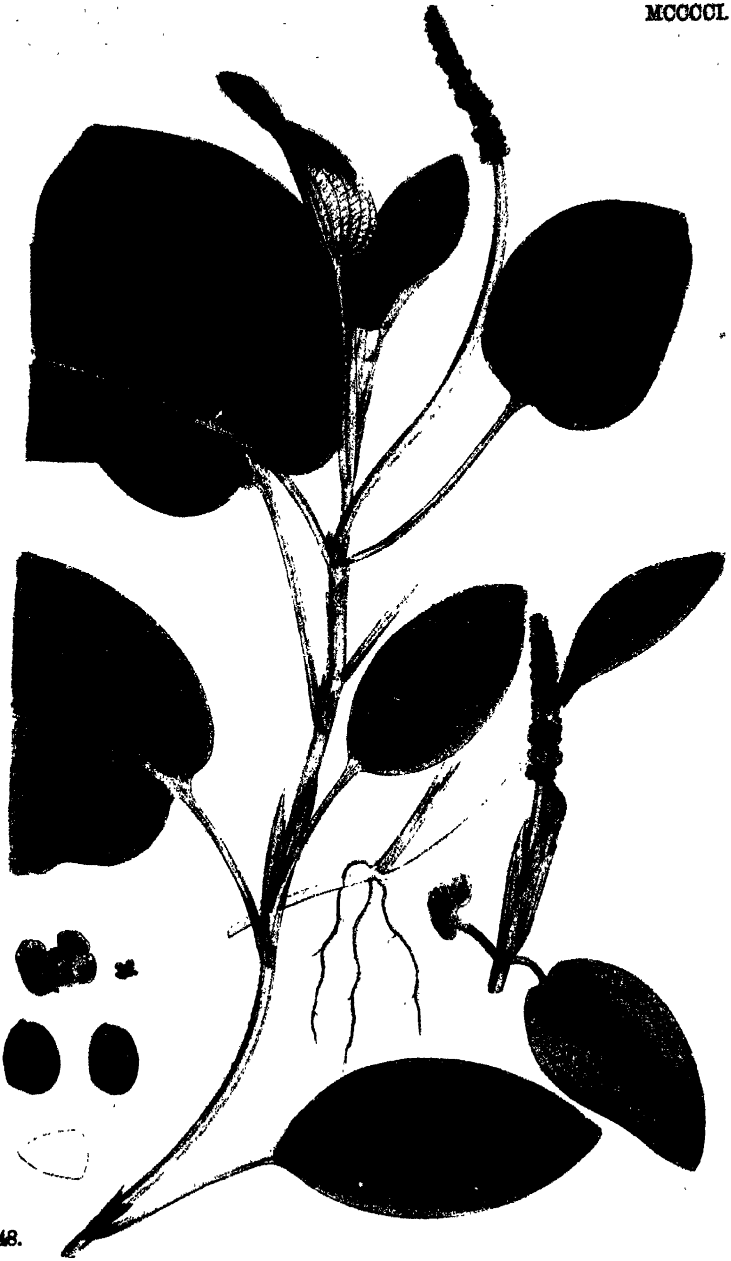
Potamogeton natans. Floating Pondweed.

MCCCC.



E. B. S. 2849.

Potamogeton polygonifolius. Oblong-leaved Pondweed.

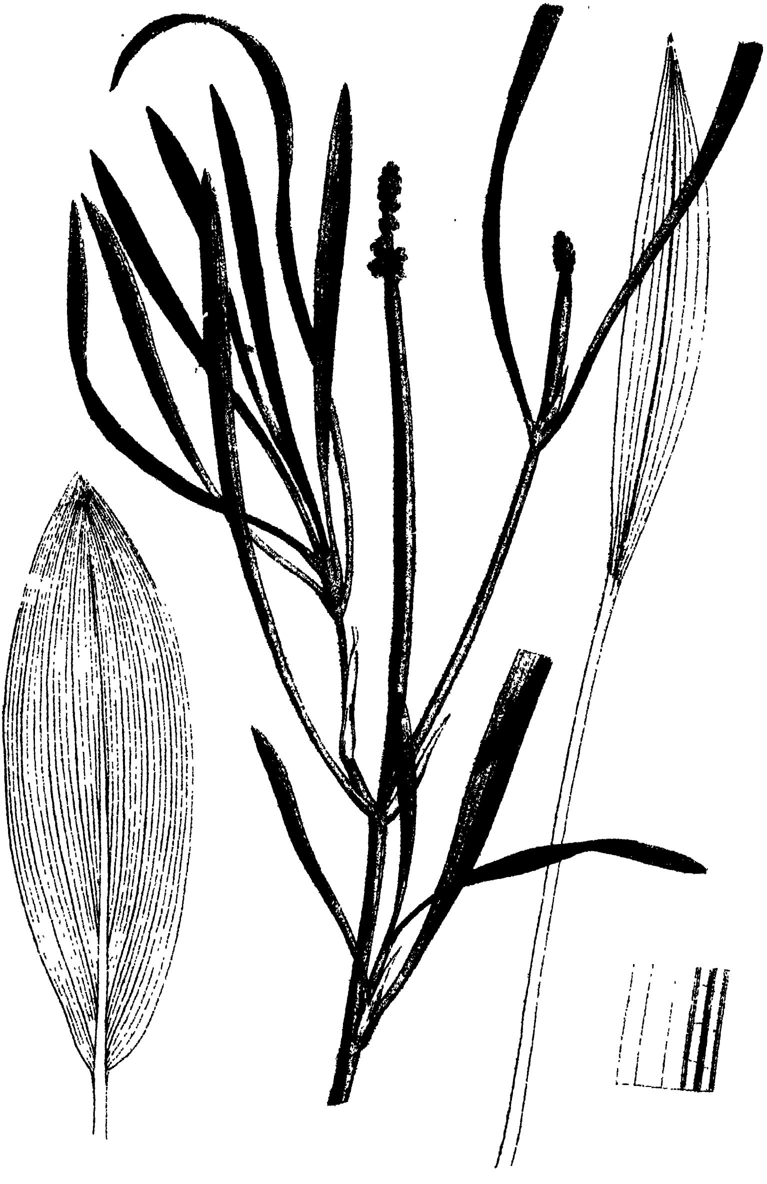


I. B. S. 2848.

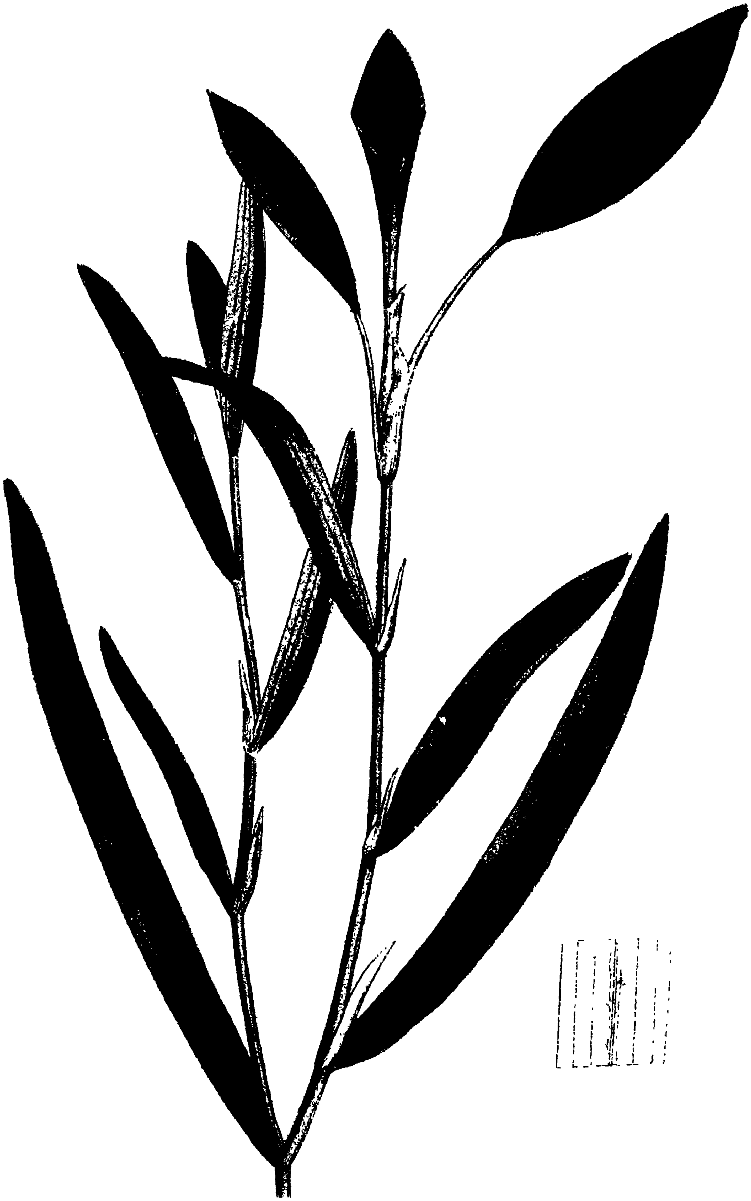
Potamogeton plantagineus.   Plantain-leaved Pondweed.

E. B. 1286.

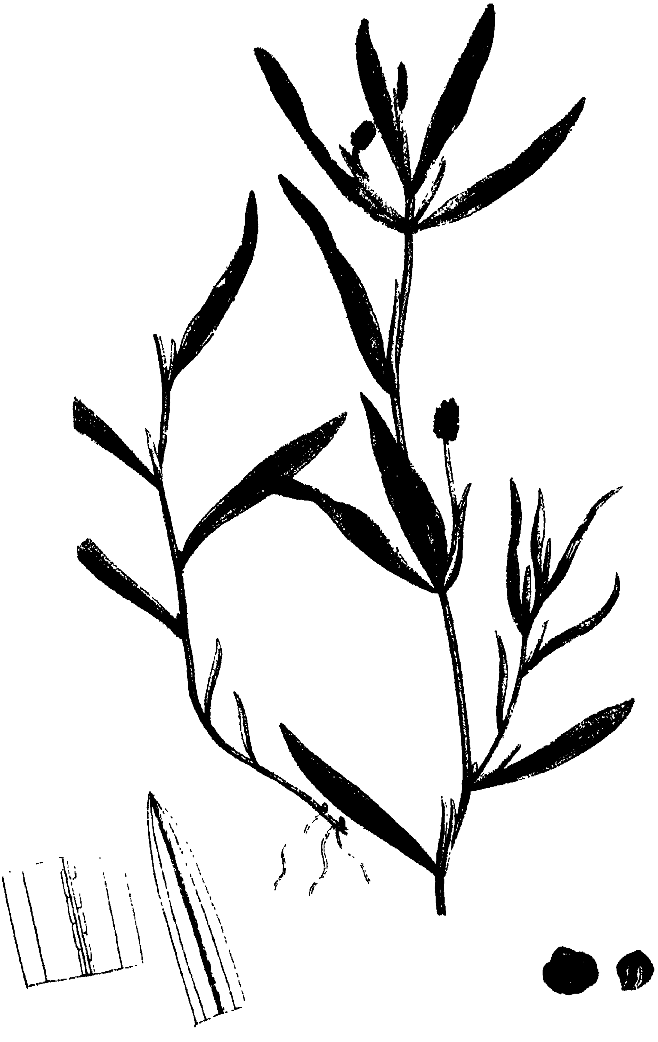
rufescens. Reddish Pondweed.



Potamogeton sparganiifolius. (?) **Ribbon-leaved**

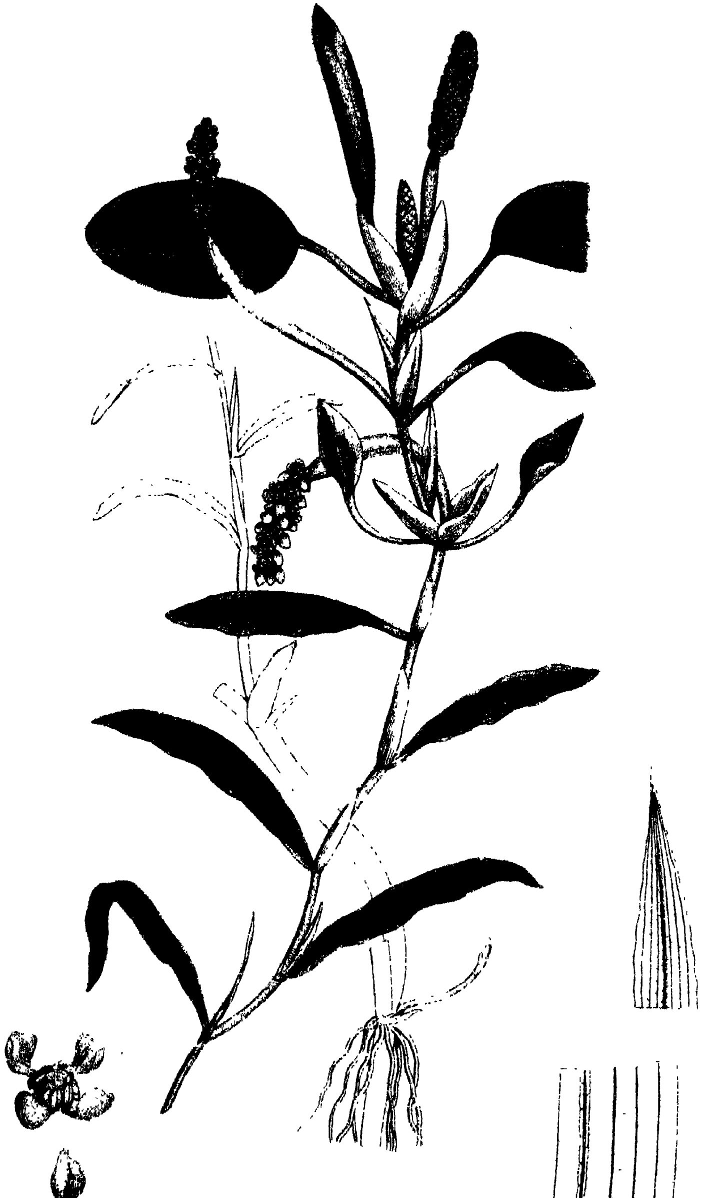


Potamogeton lonchites. Willow-leaved Pondweed.



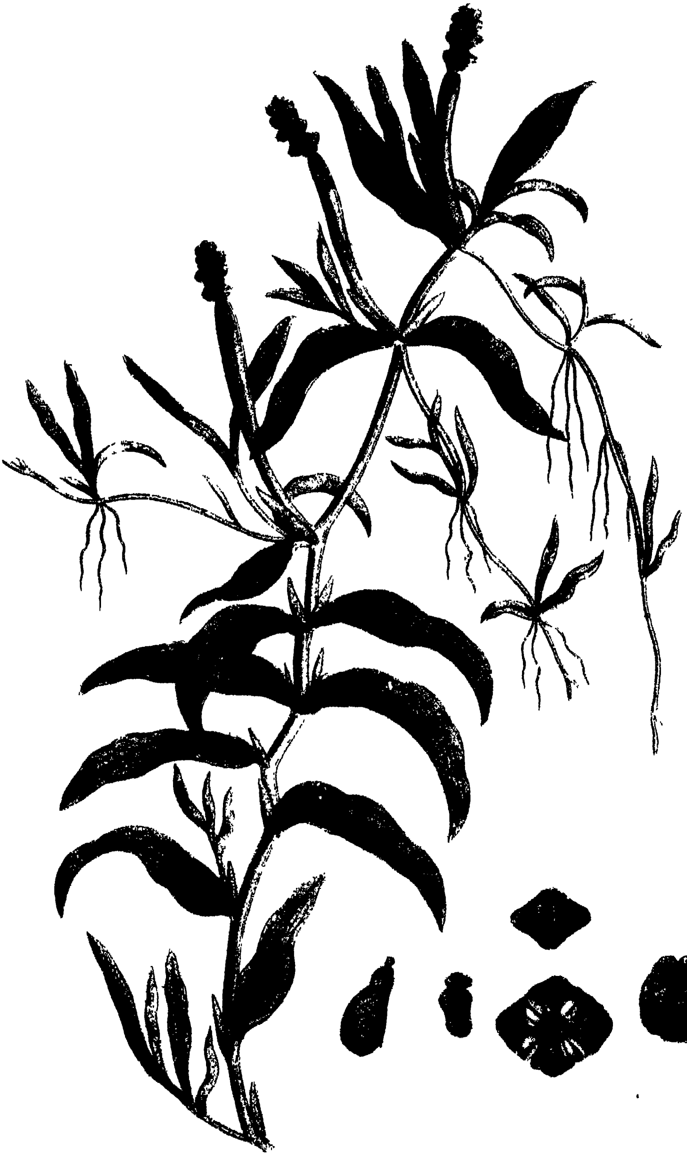
E B 1985.

Potamogeton lanceolatus.   Lanceolate Pondweed.



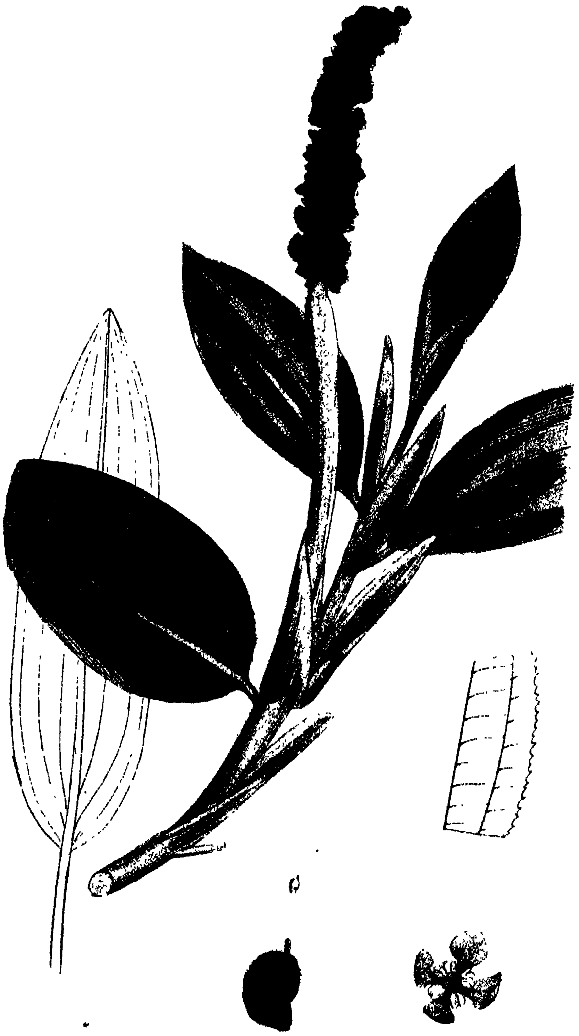
E. B. 1285.

Potamogeton heterophyllus. Various-leaved Pondweed.



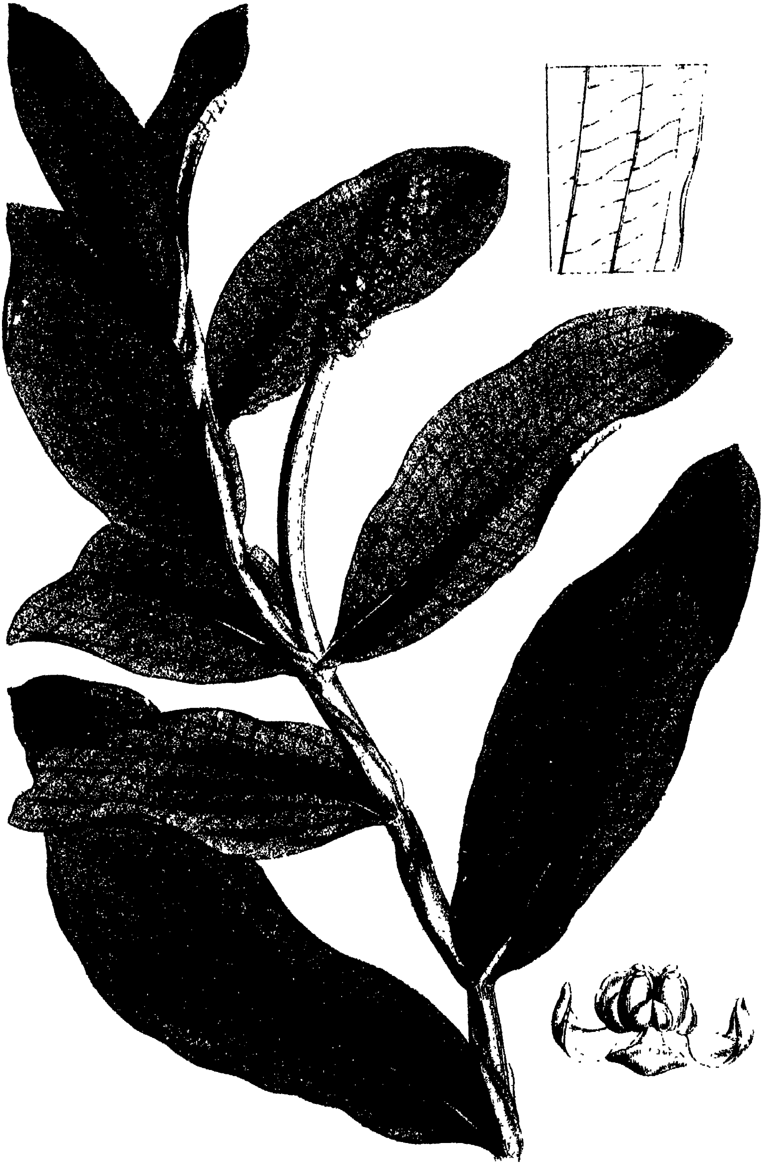
Potamogeton nitens. Shining Pondweed.

MCCCCVIII.

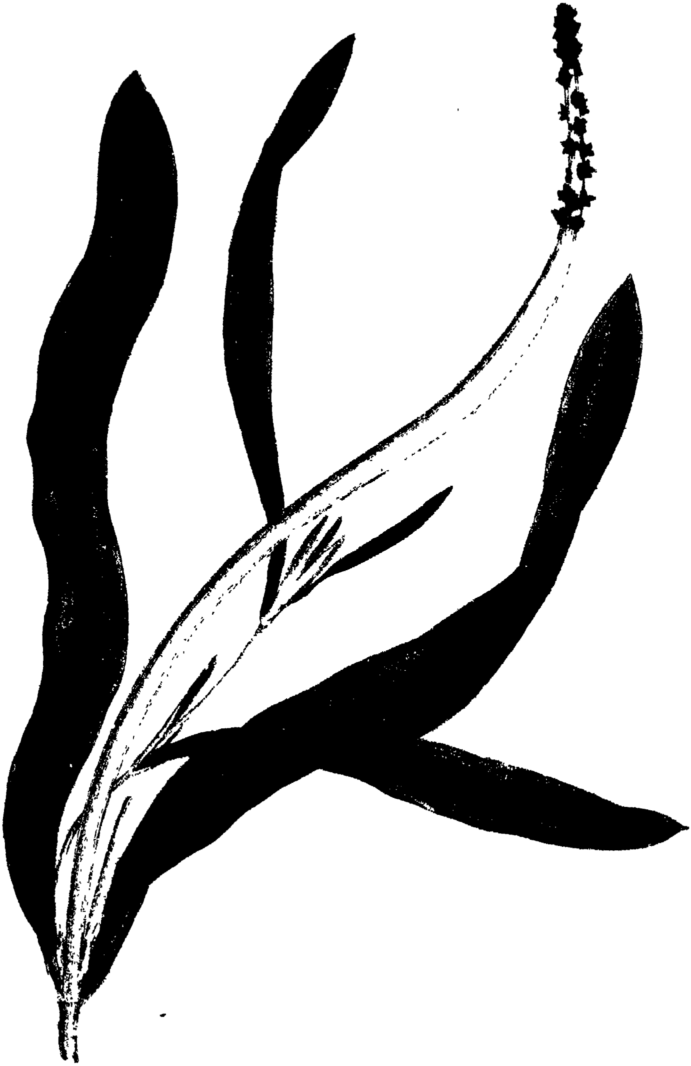


E. B. 376.

Potamogeton lucens, var. genuinus. Great Pondweed, var.

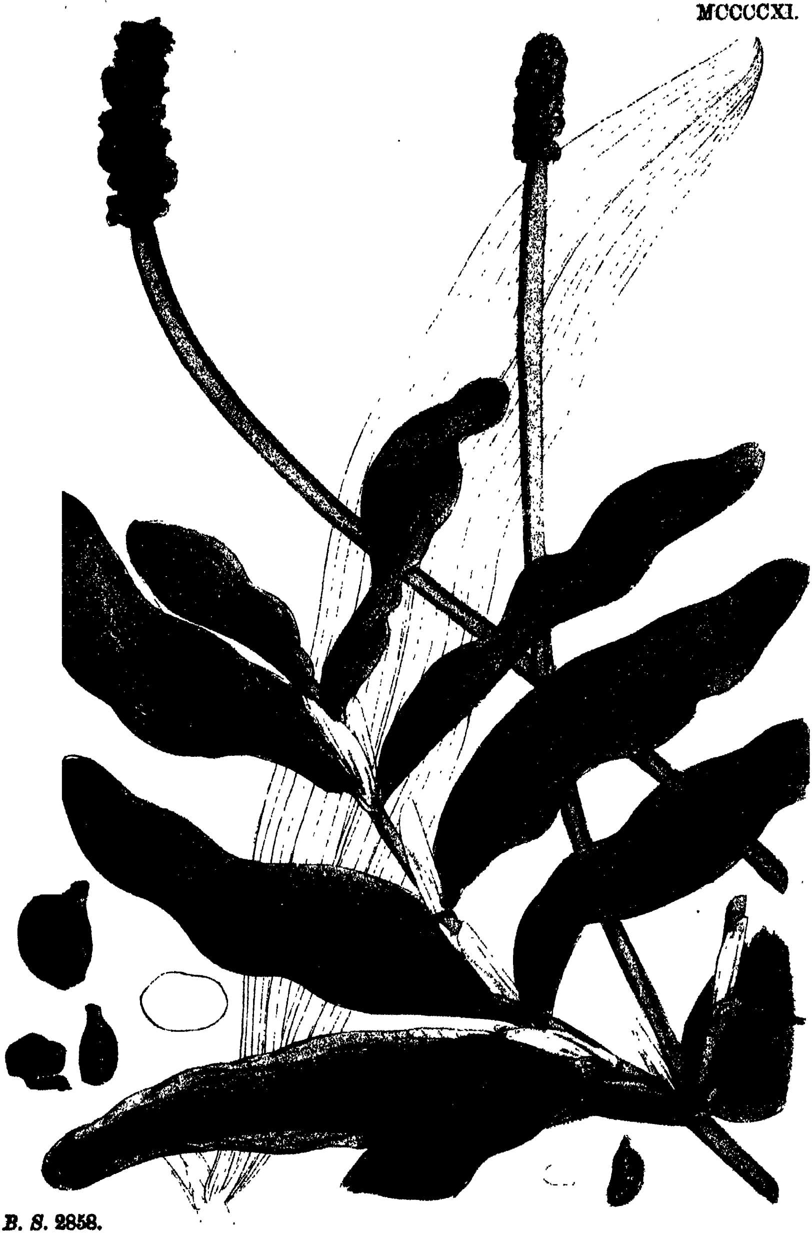


Potamogeton lucens, var. decipiens.   Great Pondweed, var. γ.



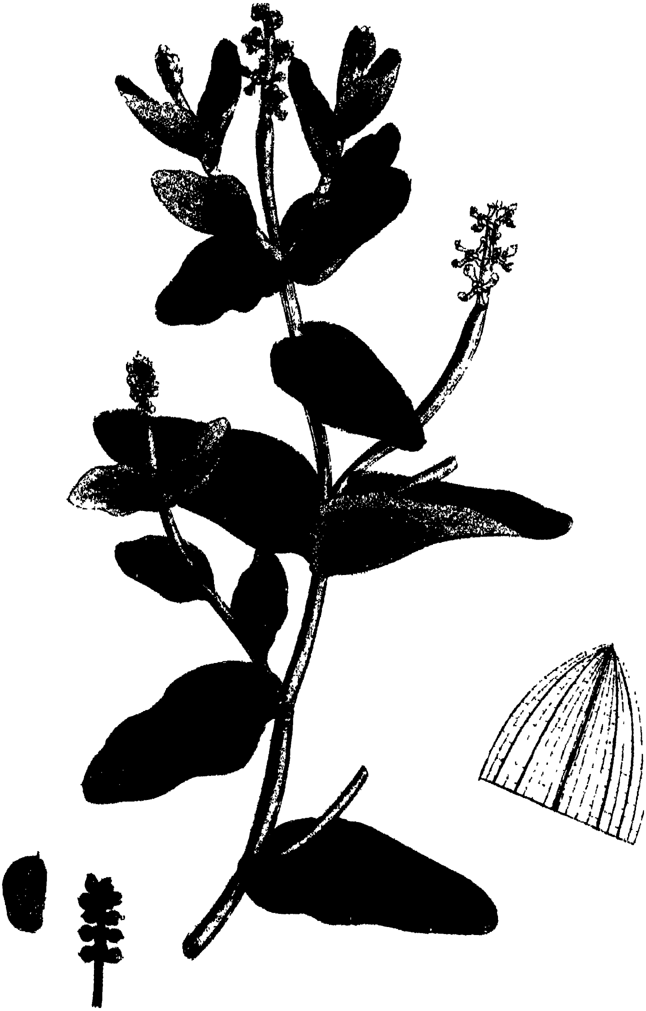
E. B. S. 2847.

Potamogeton longifolius. Long-leaved Pondweed.



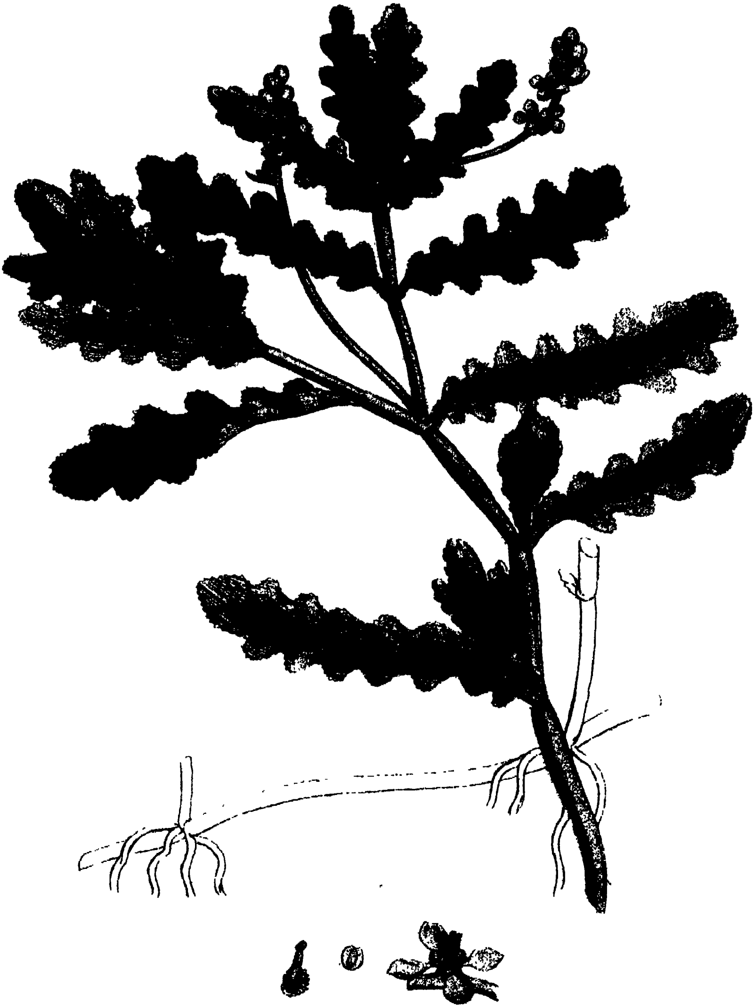
B. S. 2858.

Potamogeton prælongus. Long-stalked Pondweed.

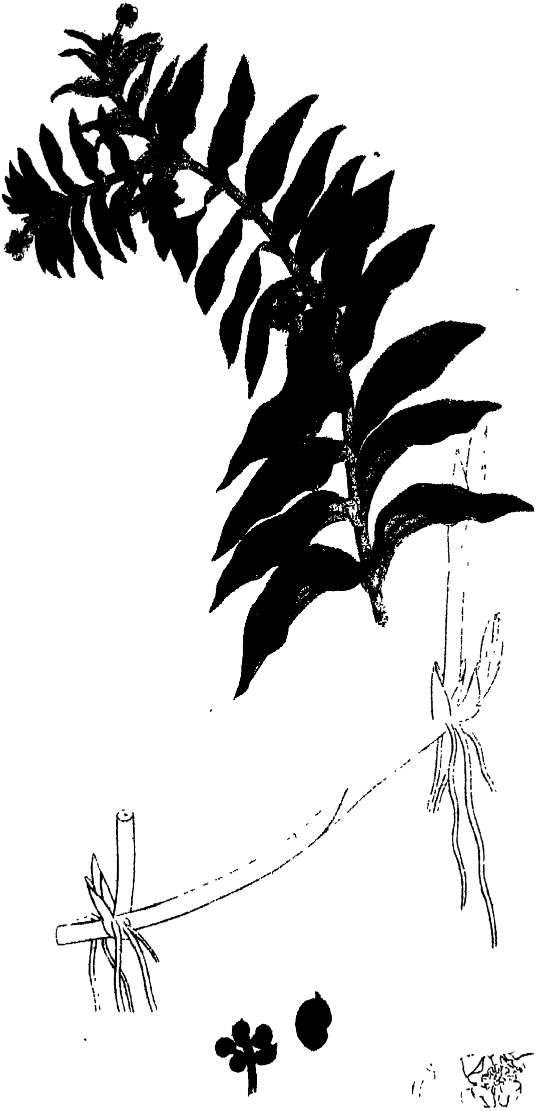


E. B. 168

. perfoliatus.   Perfoliate Pondweed.

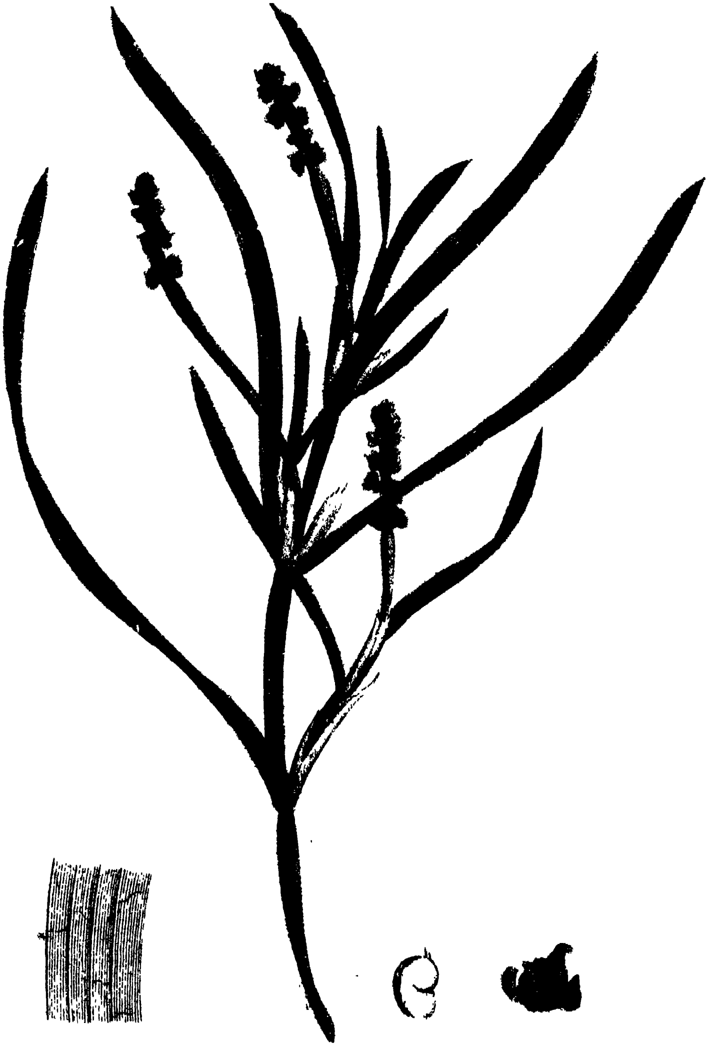


Potamogeton crispus. Curled Pondweed.



E. B. 397.

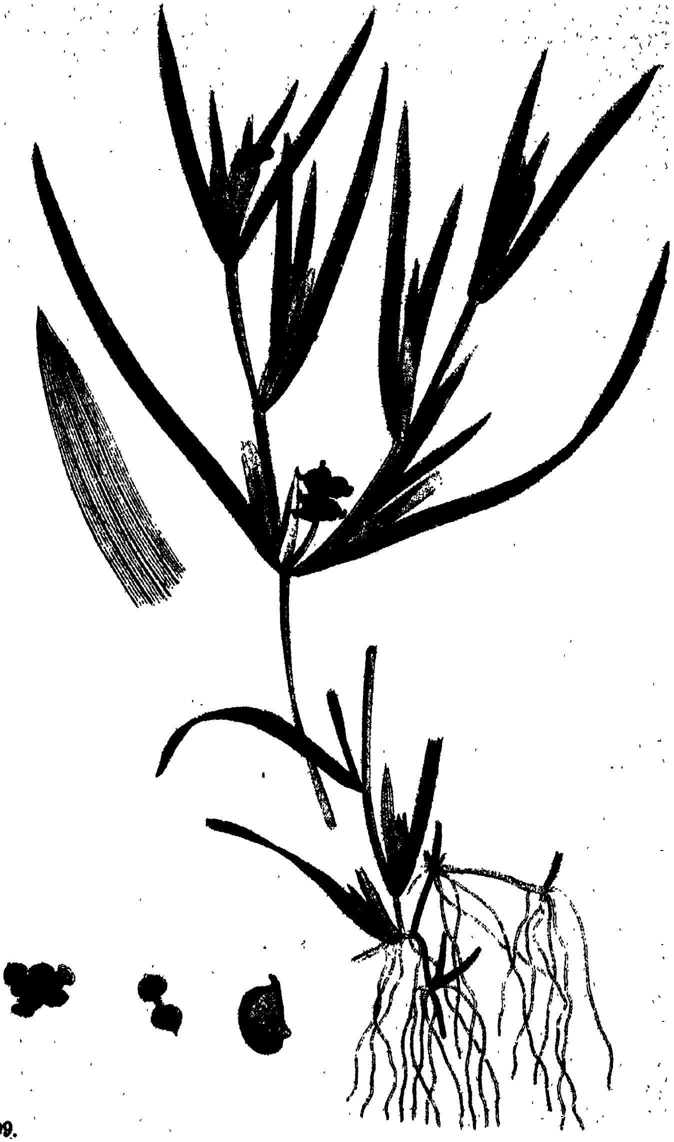
Potamogeton densus. Opposite-leaved Pondweed.



E. B. 2685.

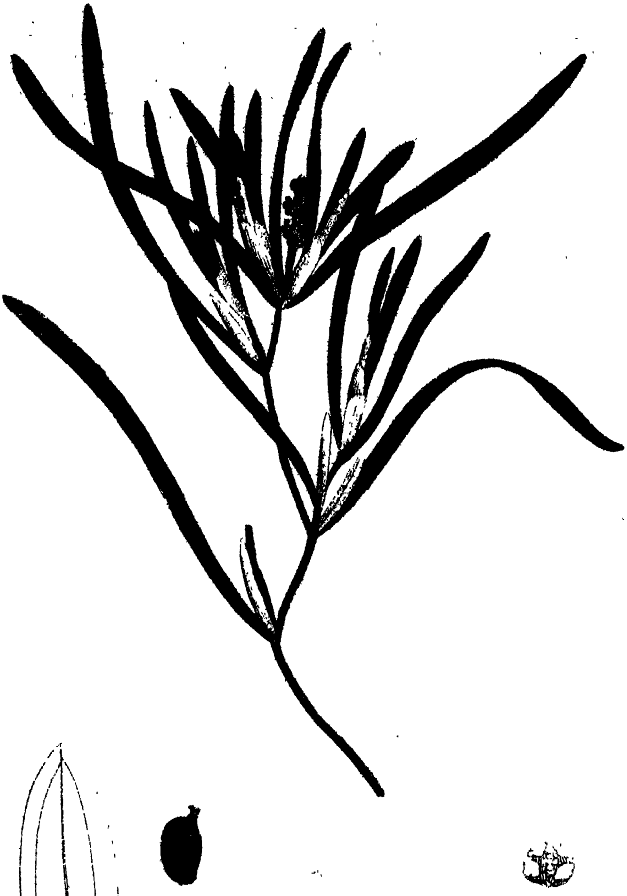
Potamogeton zosterifolius. Grass-wrack-leaved Pondweed.

MCCCCXV



E. B. S. 2609.

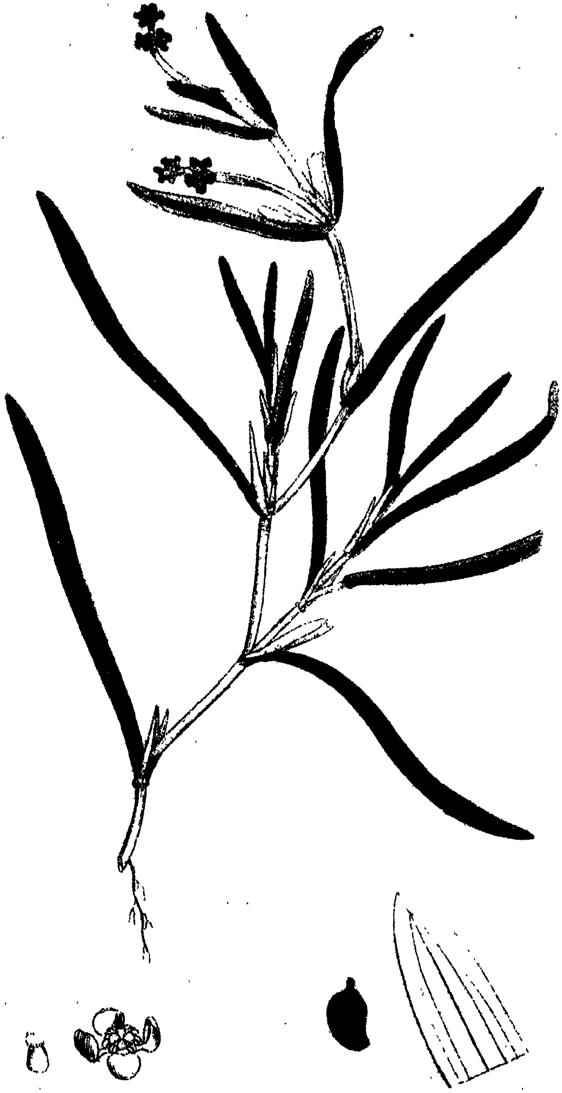
Potamogeton acutifolius. Sharp-leaved Pondweed.



E. B. 2253.

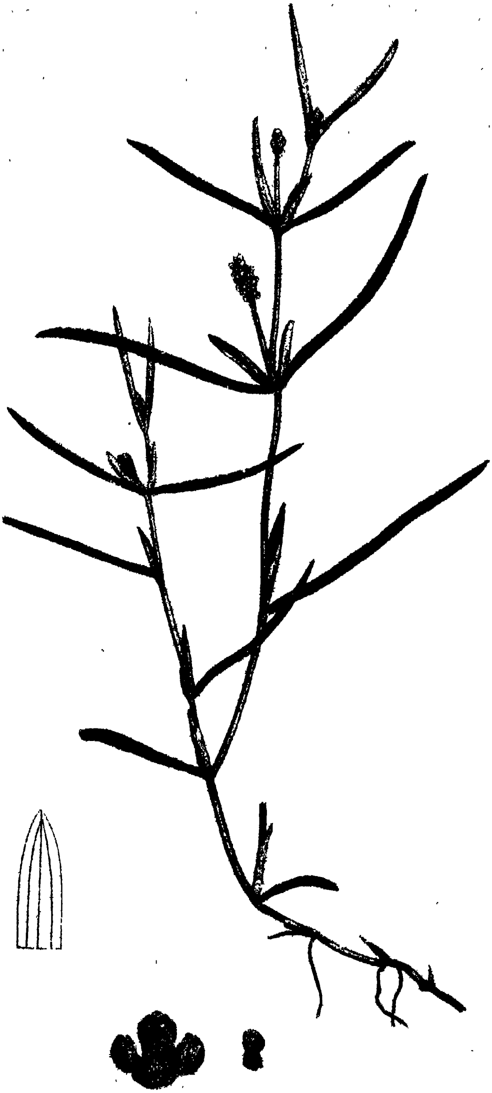
Potamogeton obtusifolius. Grassy Pondweed.

MCCCCXVII



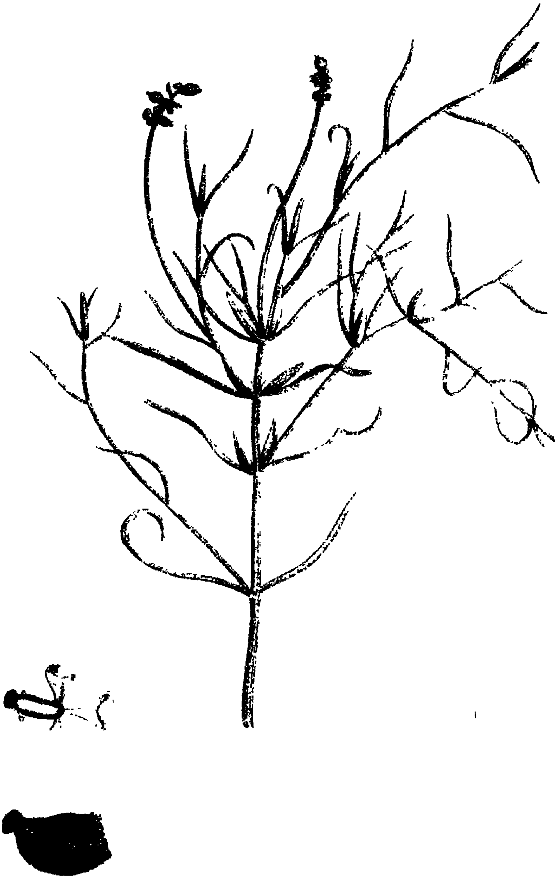
E. B. 418.

Potamogeton mucronatus. Flat-stemmed Pondweed.

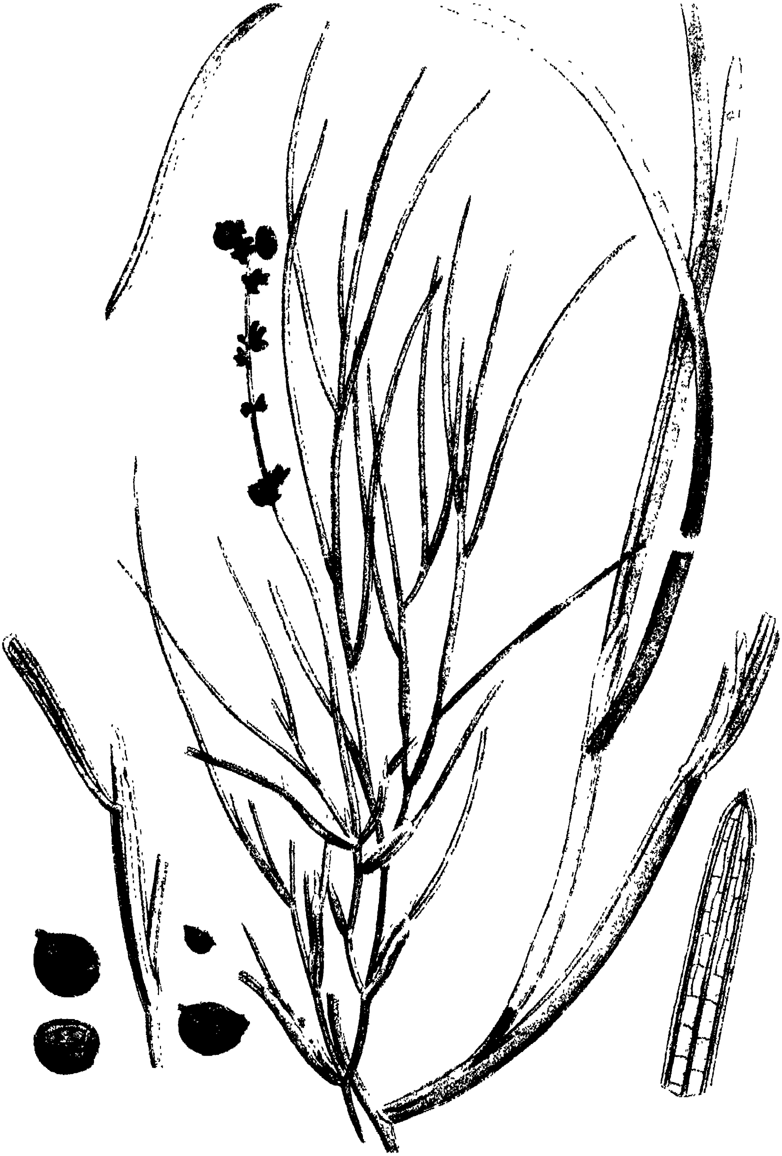


E. B. 215.

Potamogeton pusillus. Small Pondweed.

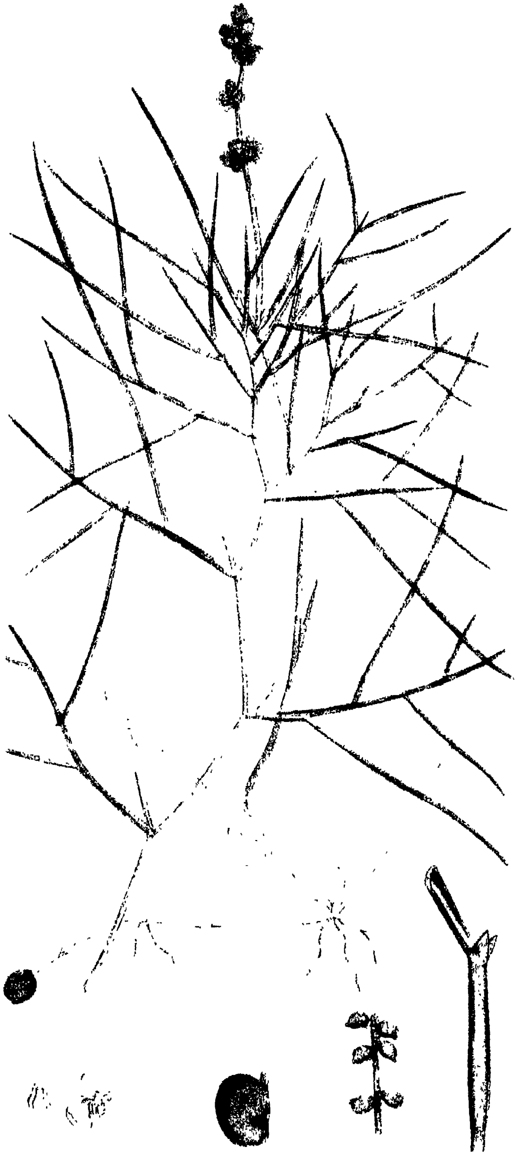


Potamogeton trichodes. **Hair-leaved Pondweed.**



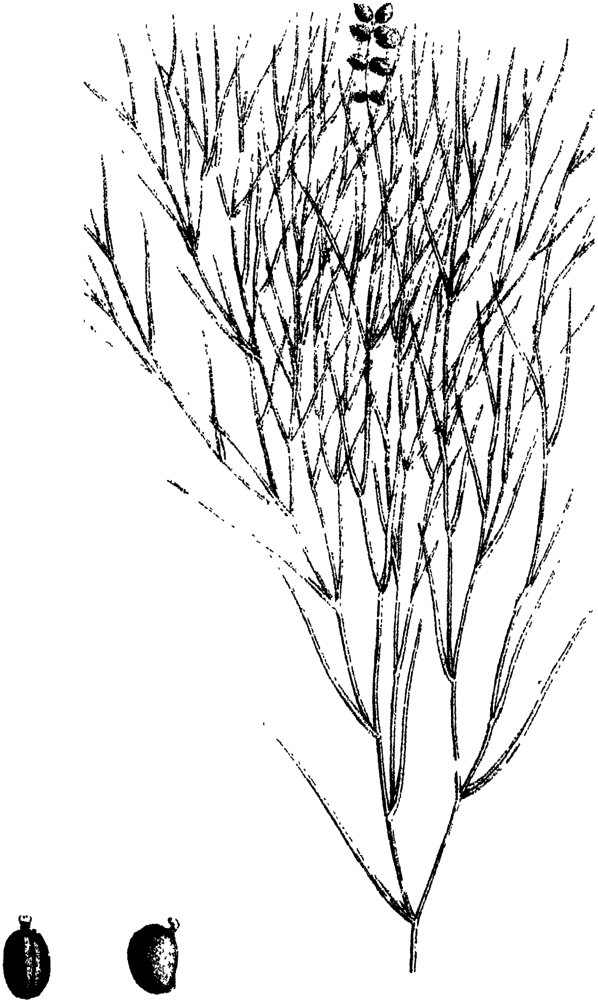
Potamogeton flabellatus. Fan-like Pondweed.

MCCCCXXII.

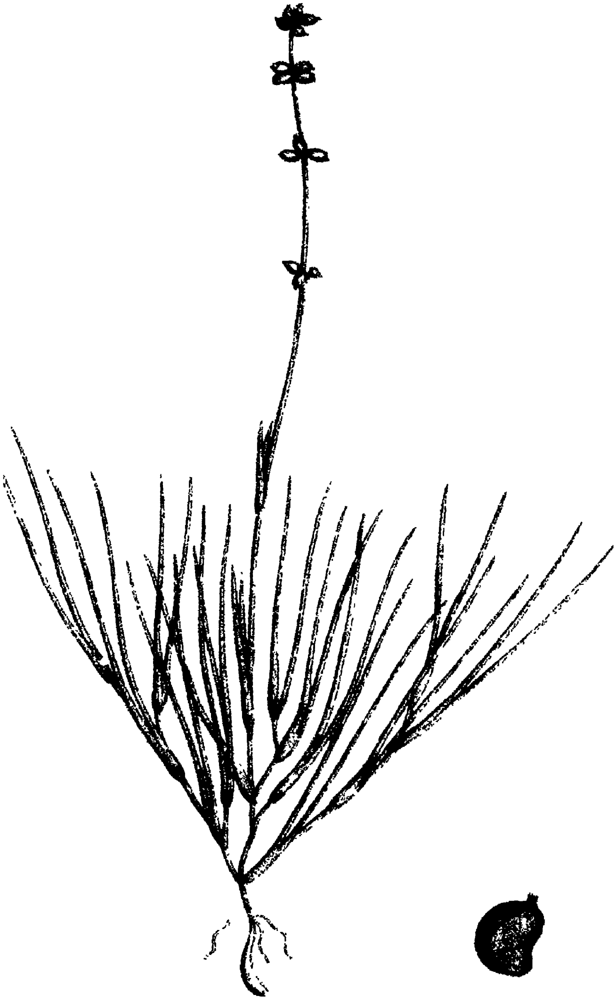


E.B. 323.

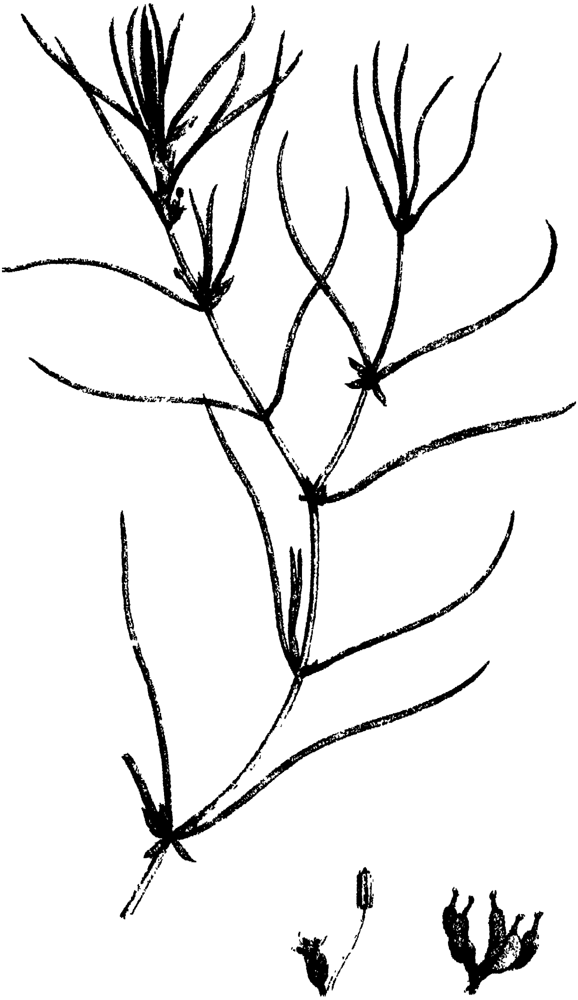
Potamogeton eu-pectinatus, var. genuinus. Fennel-leaved Pondweed, var. α.



Potamogeton eu-pectinatus, var. scoparius. **Fennel-leaved Pondweed, var.**

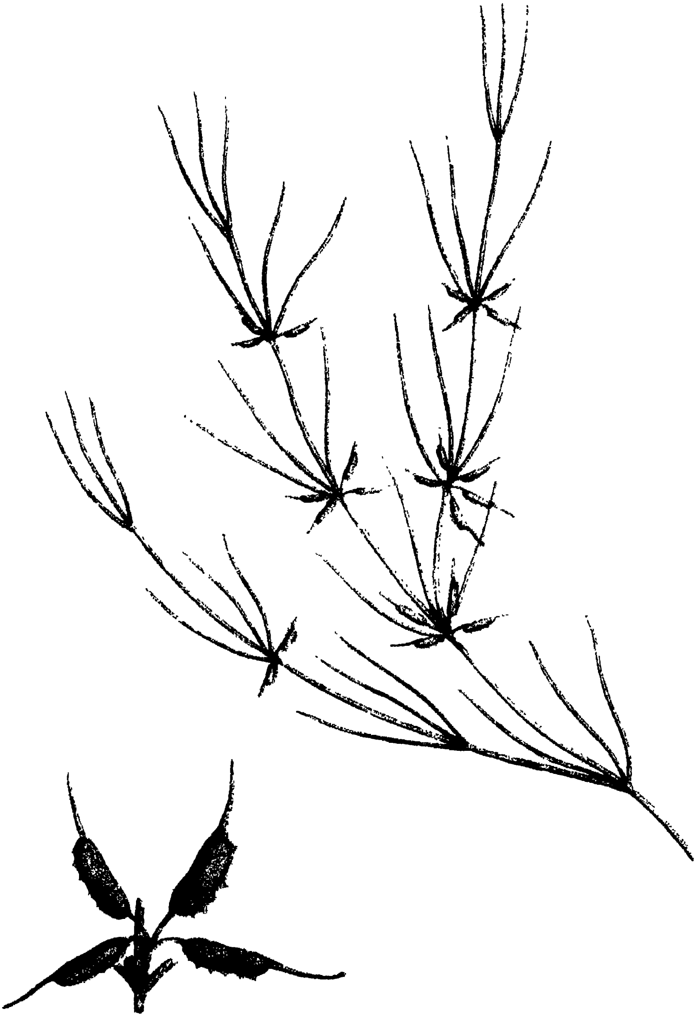


Potamogeton filiformis. Slender-leaved Pondweed.

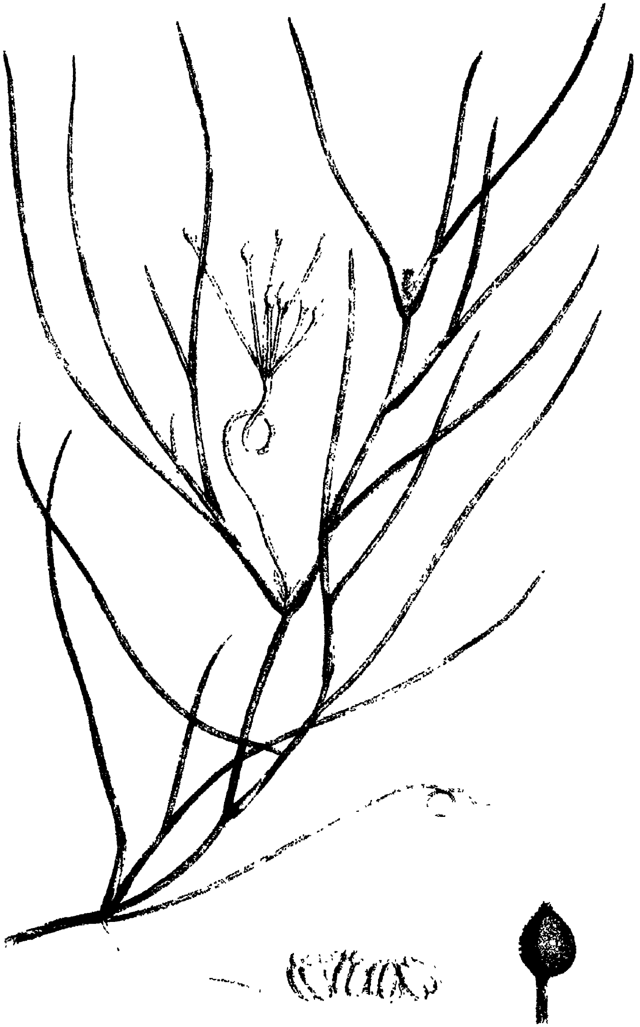


E. B. 1844.

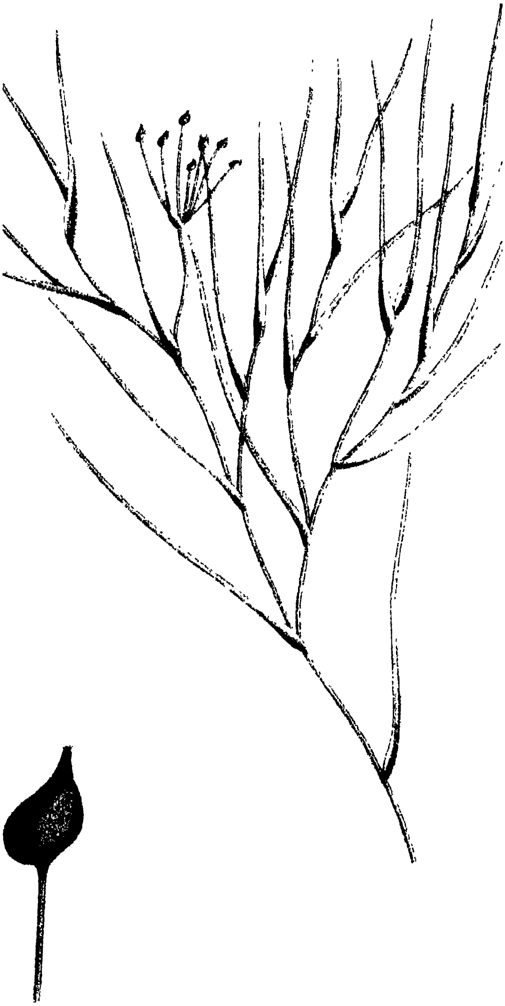
eu-palustris. Common Horned-Pondweed.



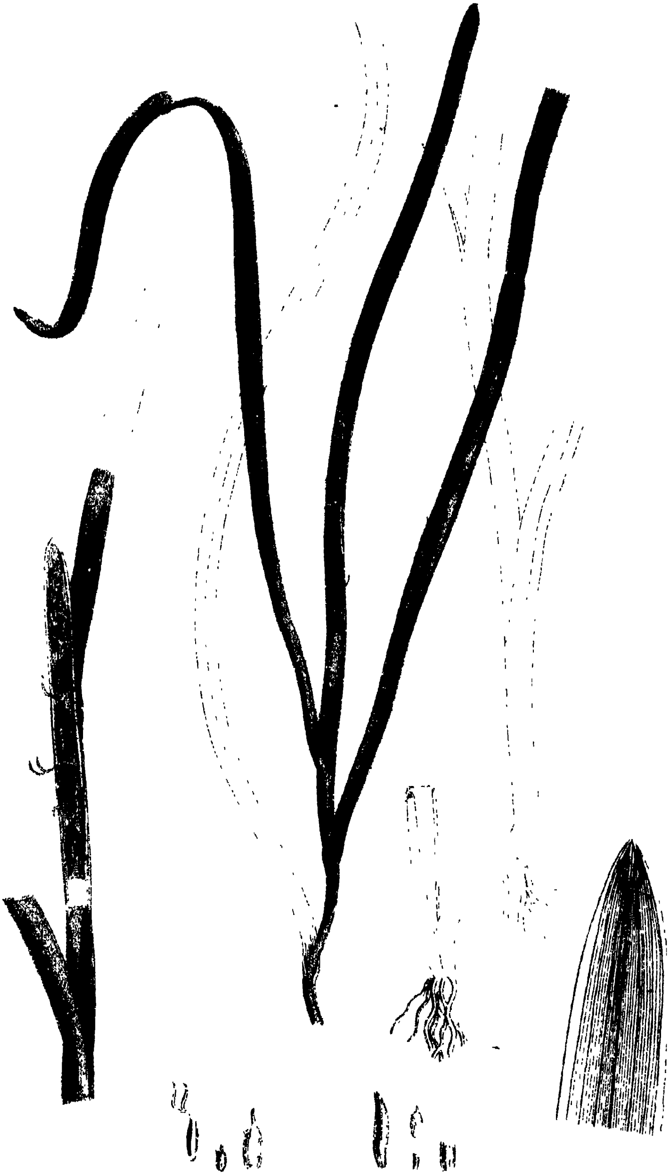
Zannichellia pedicellata. Stalked-fruited Horned-Pondweed.



Ruppia spiralis. Greater Ruppia.

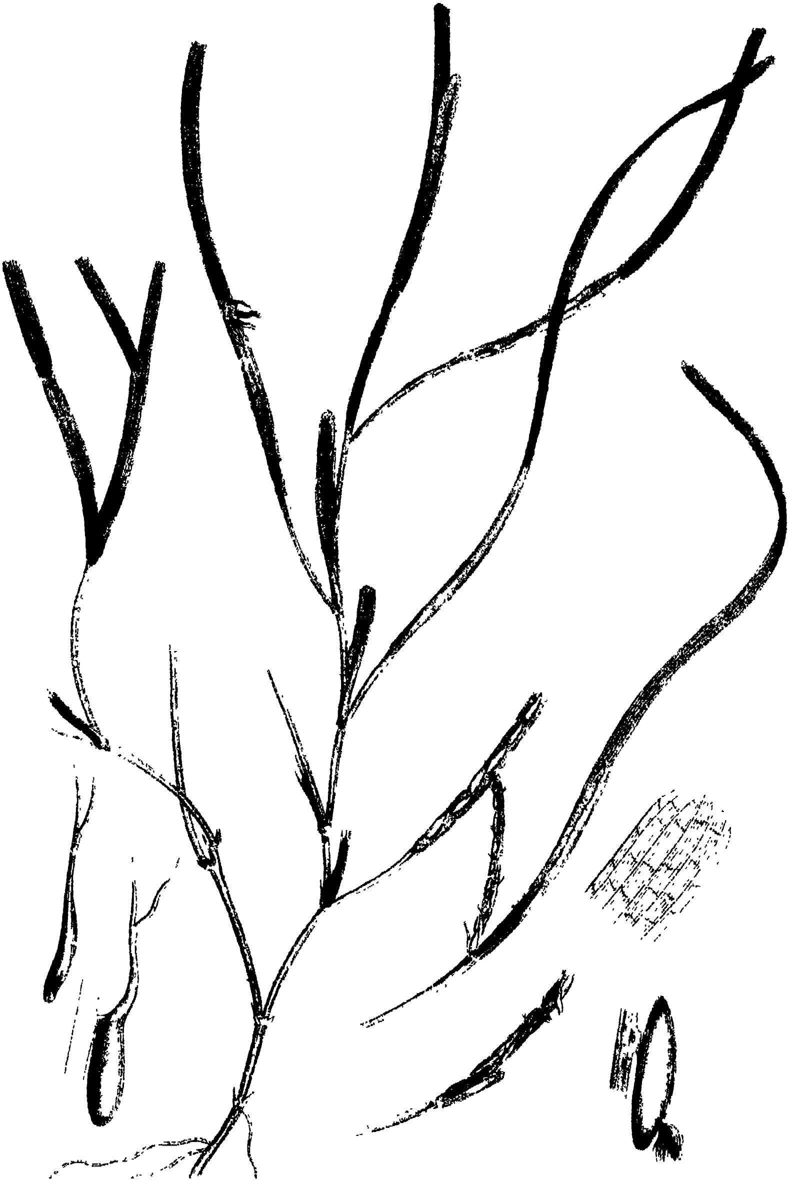


Ruppia rostellata. Lesser Ruppia.

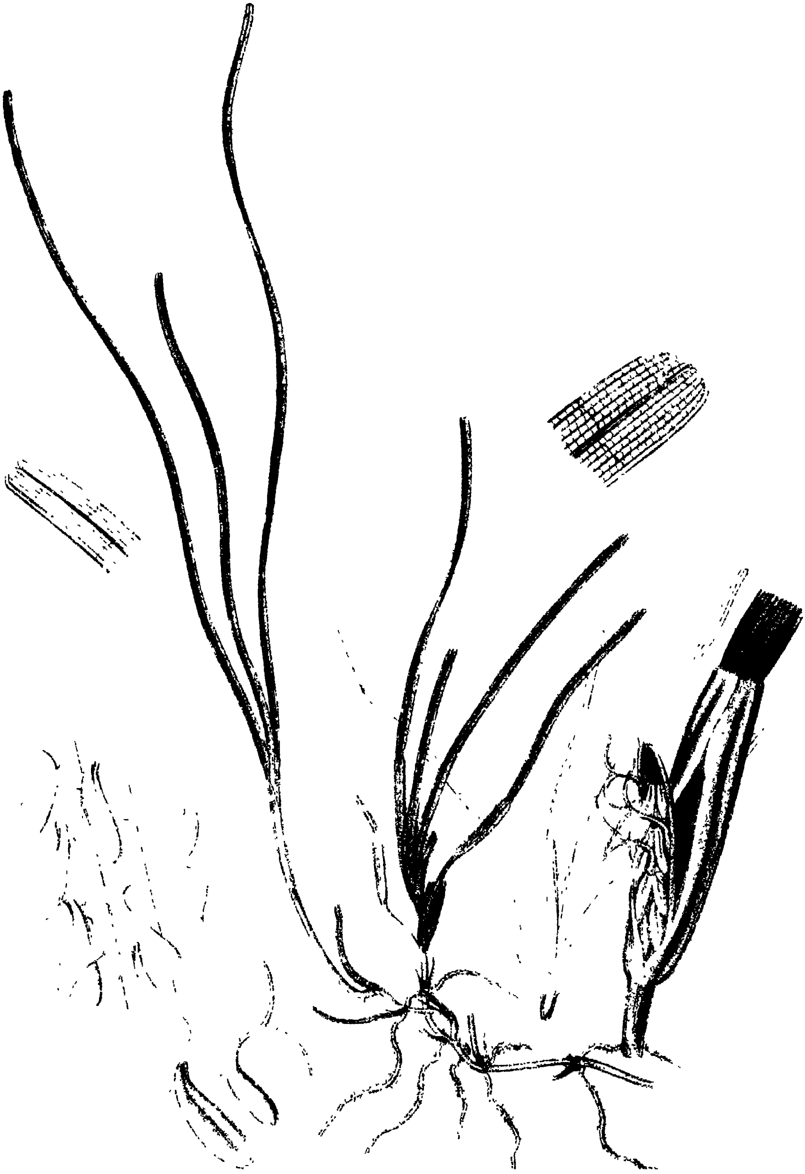


E. B. 467.

marina, var. genuina. Common Grass-wrack, var. α.

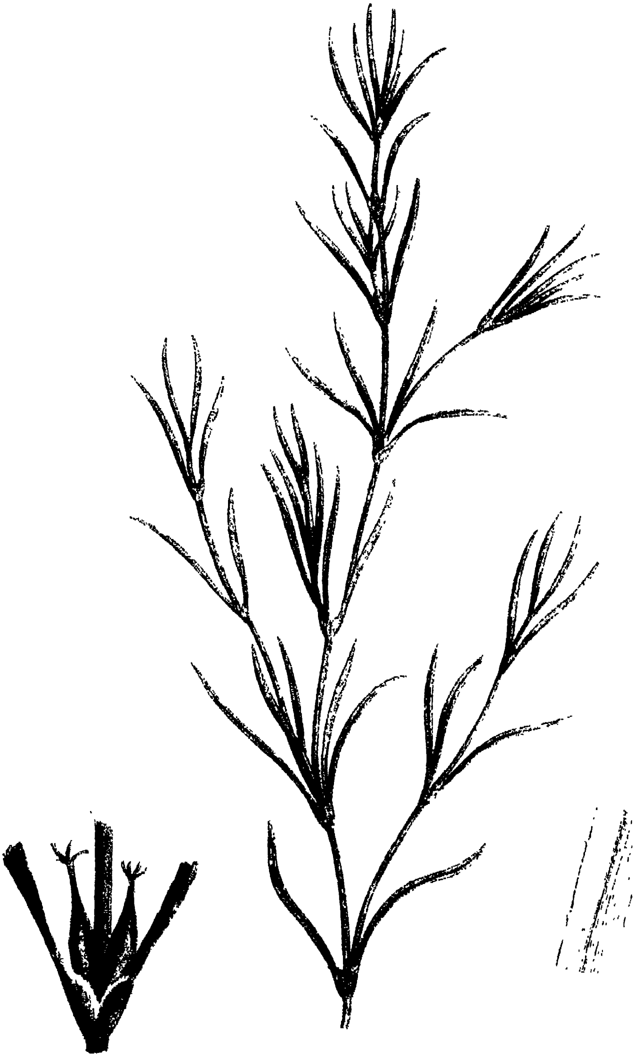


Zostera marina, var. angustifolia. Common Grass-wrack, var. *β*.

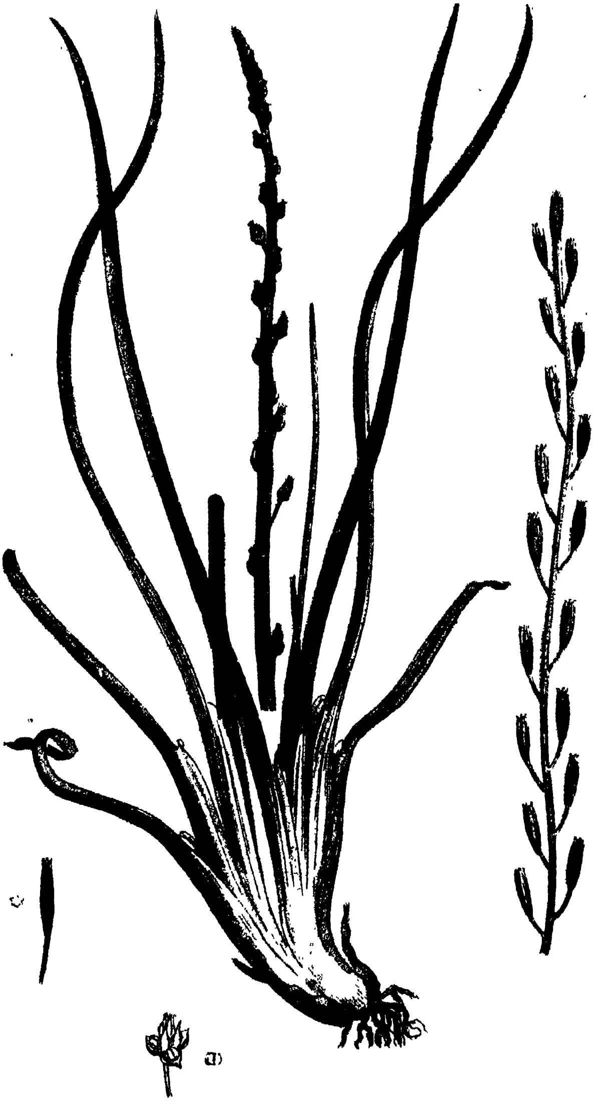


Dwarf Grass-wrack.

MCCCCXXXII.

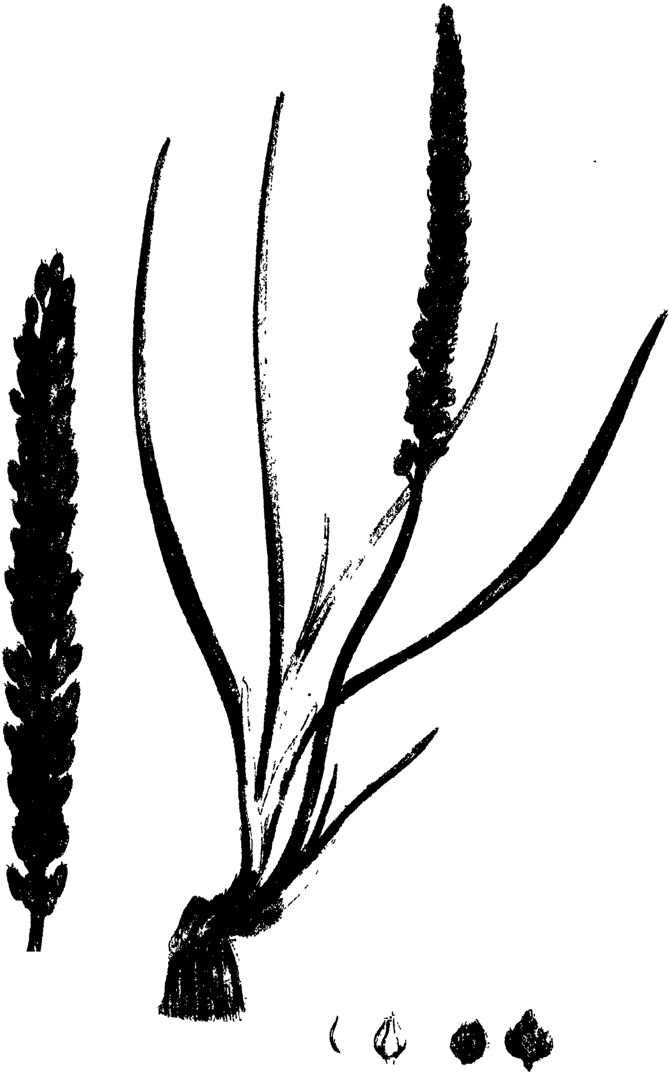


Flexible Naias



E. B. 366.

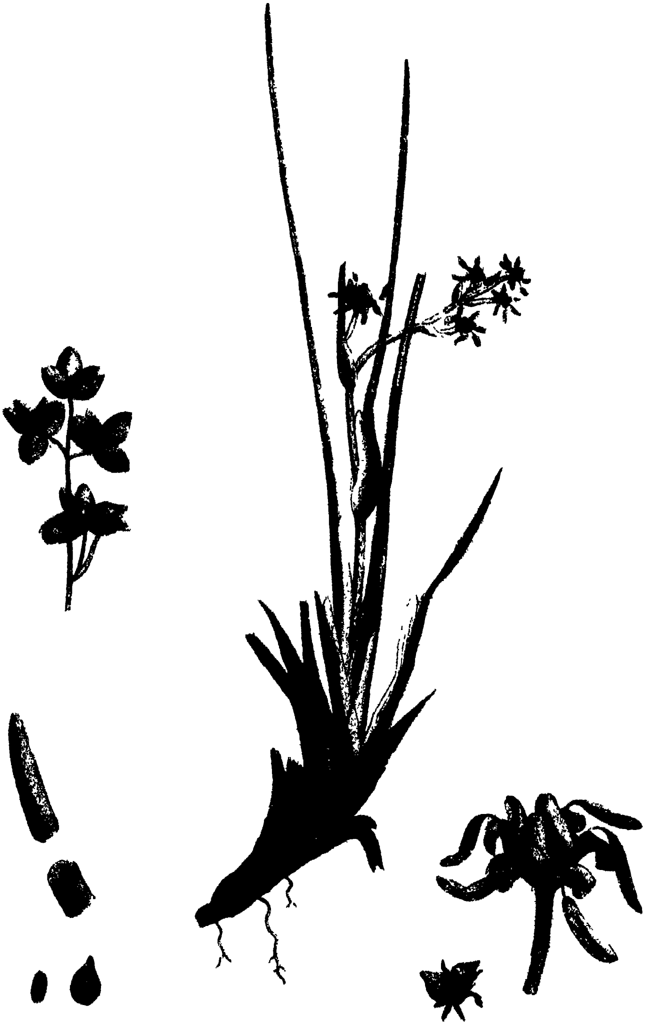
Triglochin palustre. Marsh



E. B. 255.

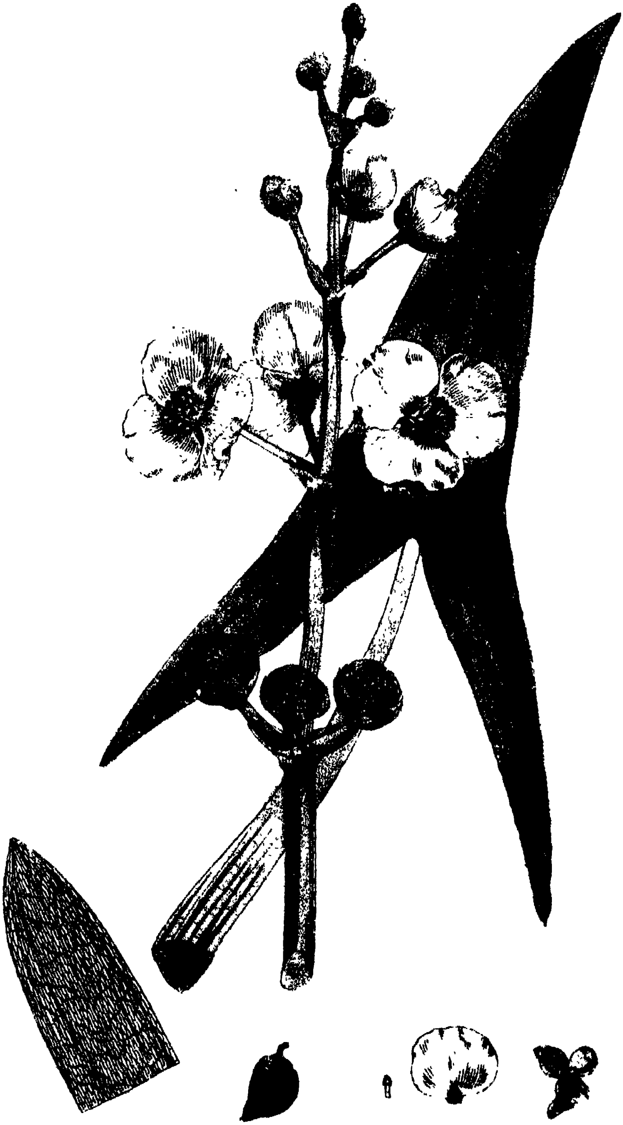
Triglochin maritimum. Sea-side Arrow-grass.

MCCCCXXXV.



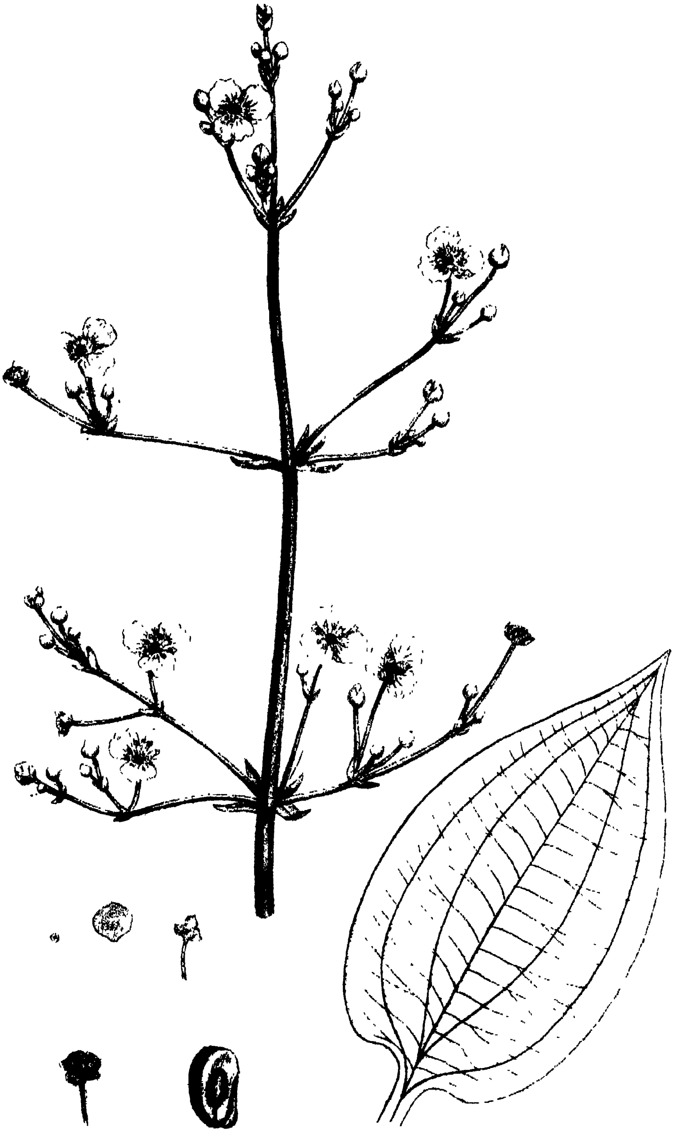
B. 1801.

Scheuchz lustris. Marsh Scheuchzeria.



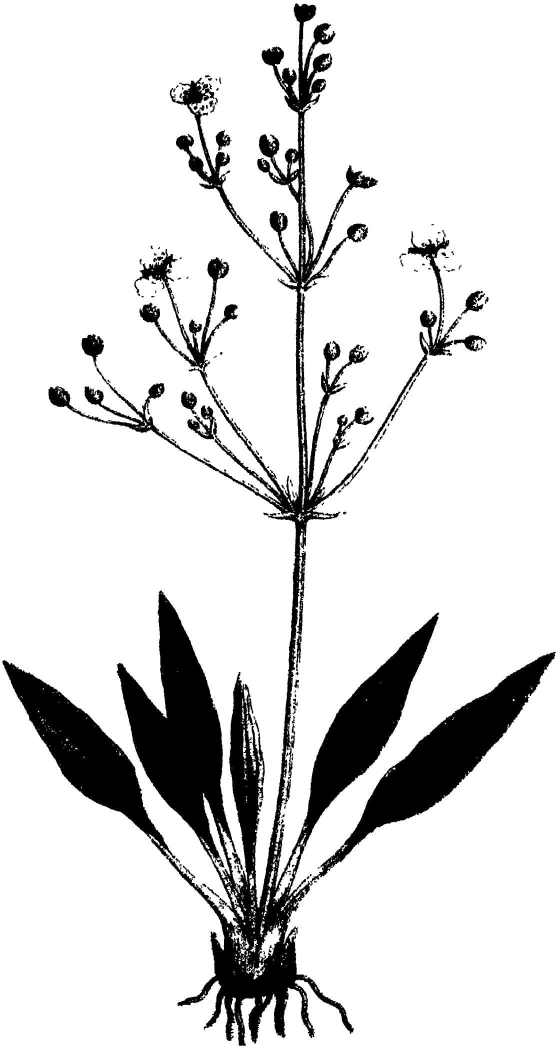
E. B. 84

Sagittaria sagittifolia. Common Arrow-head.

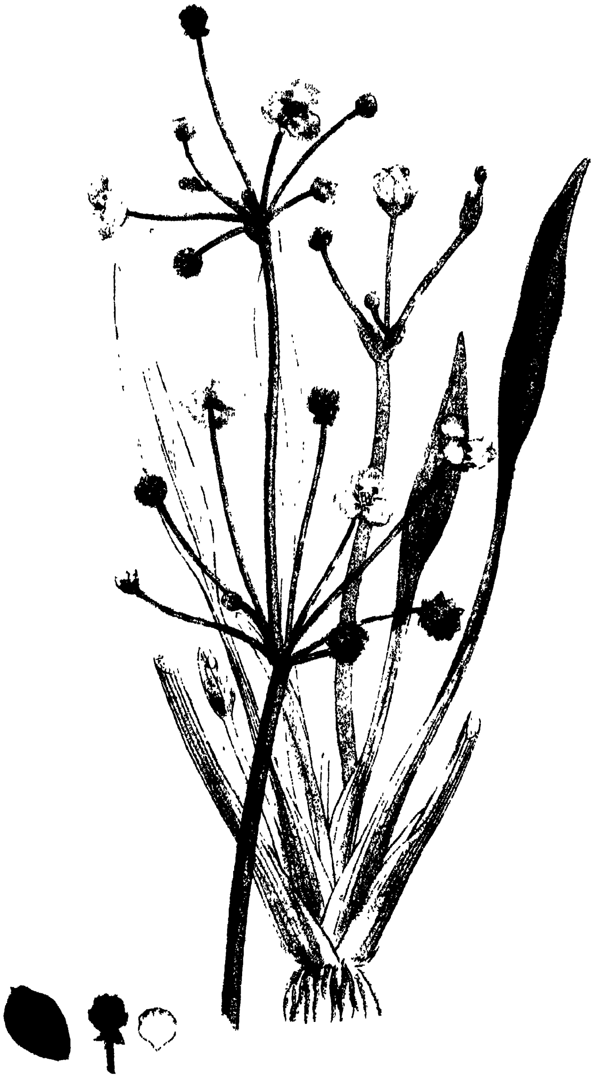


. *B*. 837.

Alisma Plantago, var. genuina. Greater Water-Plantain, var. *a*.

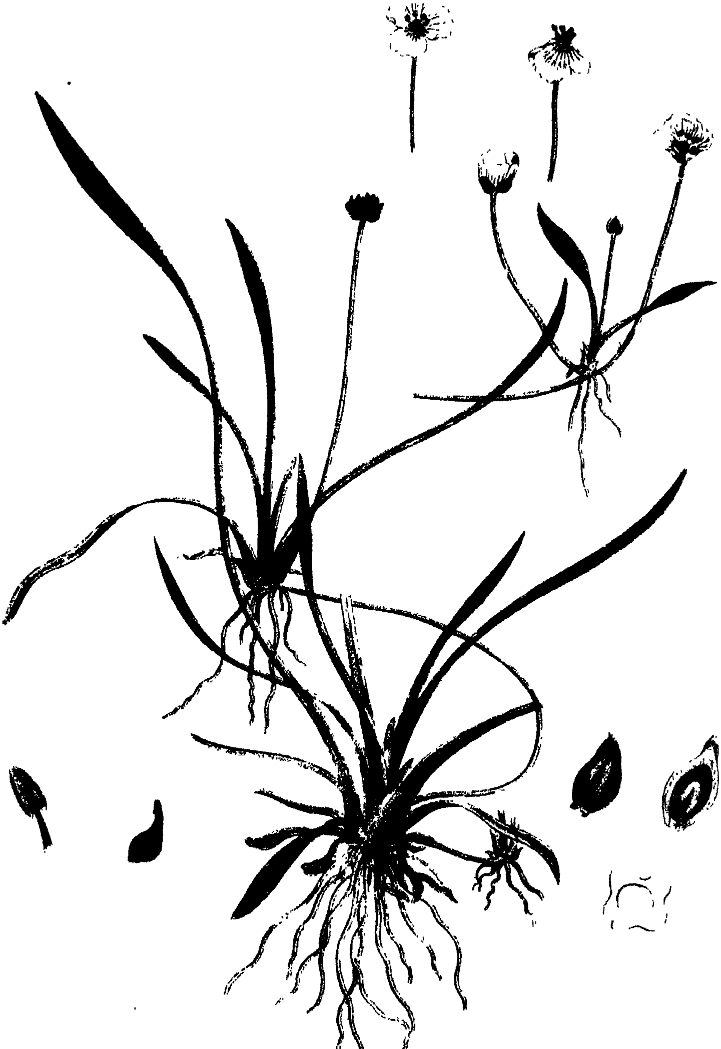


Alisma Plantago, var. lanceolata.   Greater Water-Plantain, var. β.



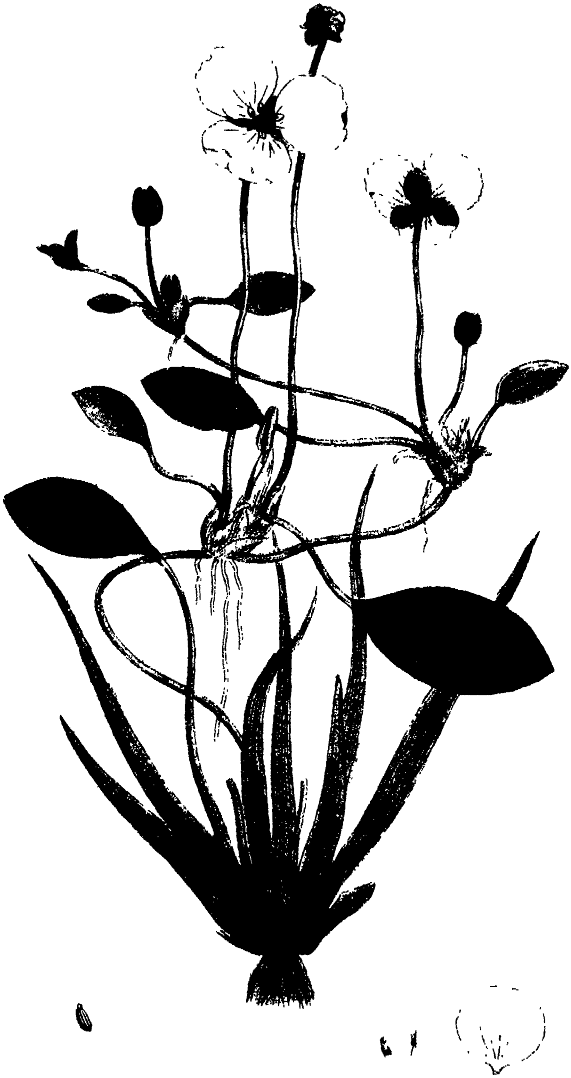
E. B. 326.

Alisma ranunculoides, var. genuina. Lesser Water-Plantain, var.



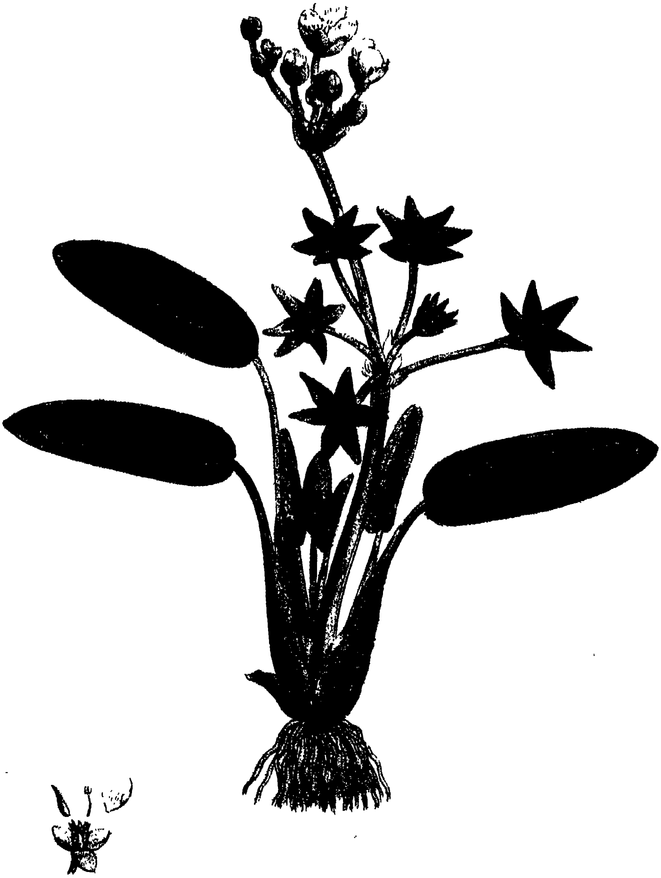
E. B. S. 2722.

Alisma ranunculoides, var. repens. **Lesser Water-Plantain, var.**



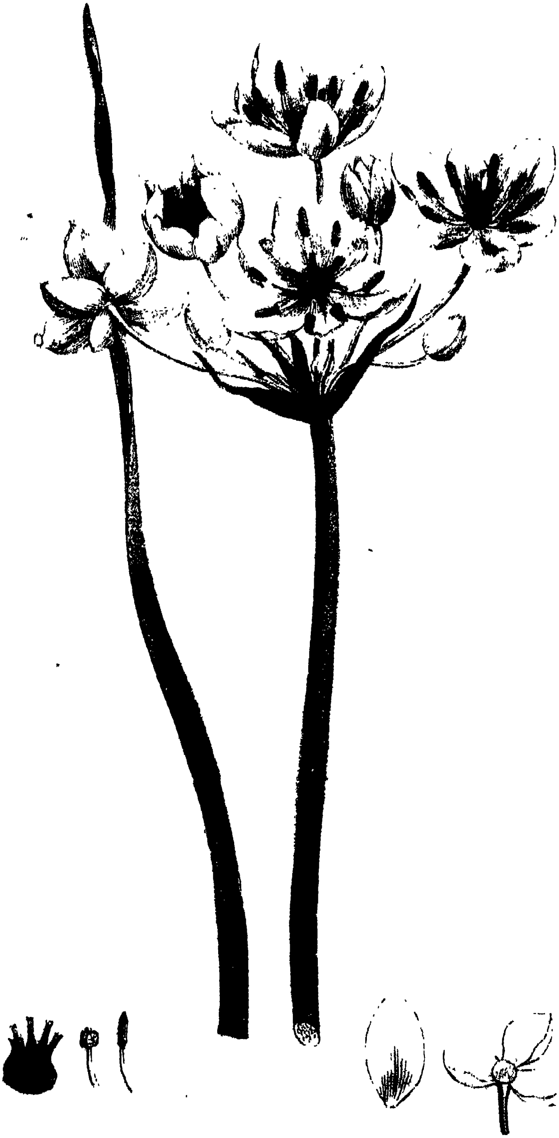
E. B. 775.

Alisma natans. Floating Water-Plantain.



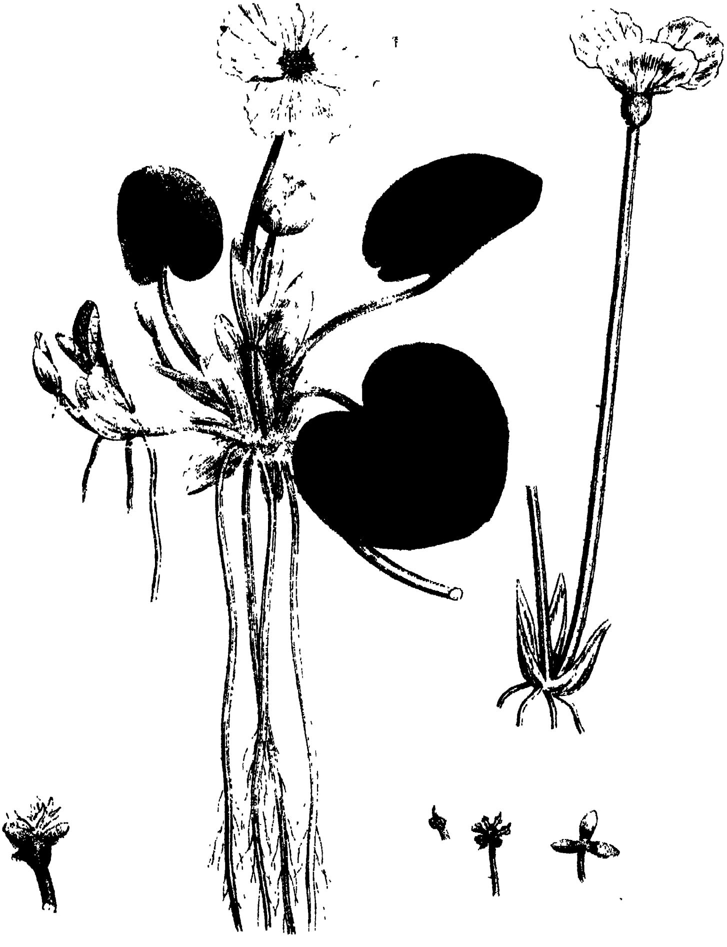
E. B. 1615.

Actinocarpus Damasonium. Thrumwort.



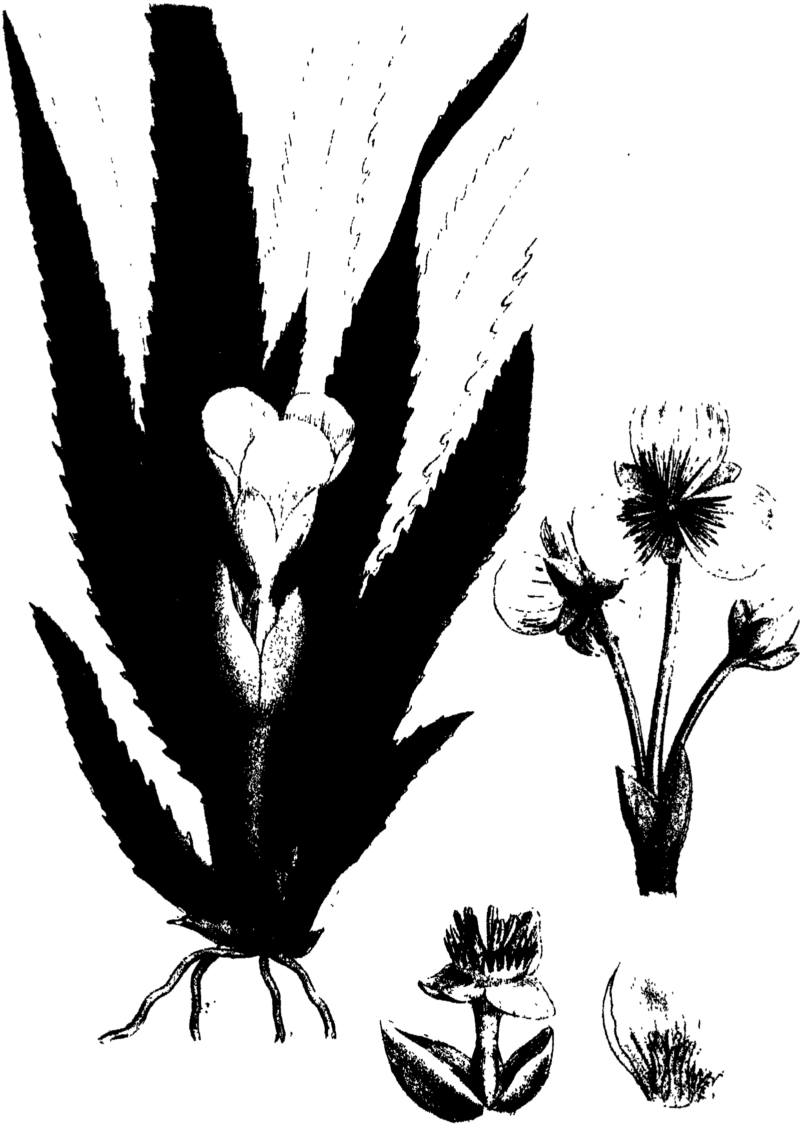
E. B. 651.

Butomus umbellatus. Flowering Rush.



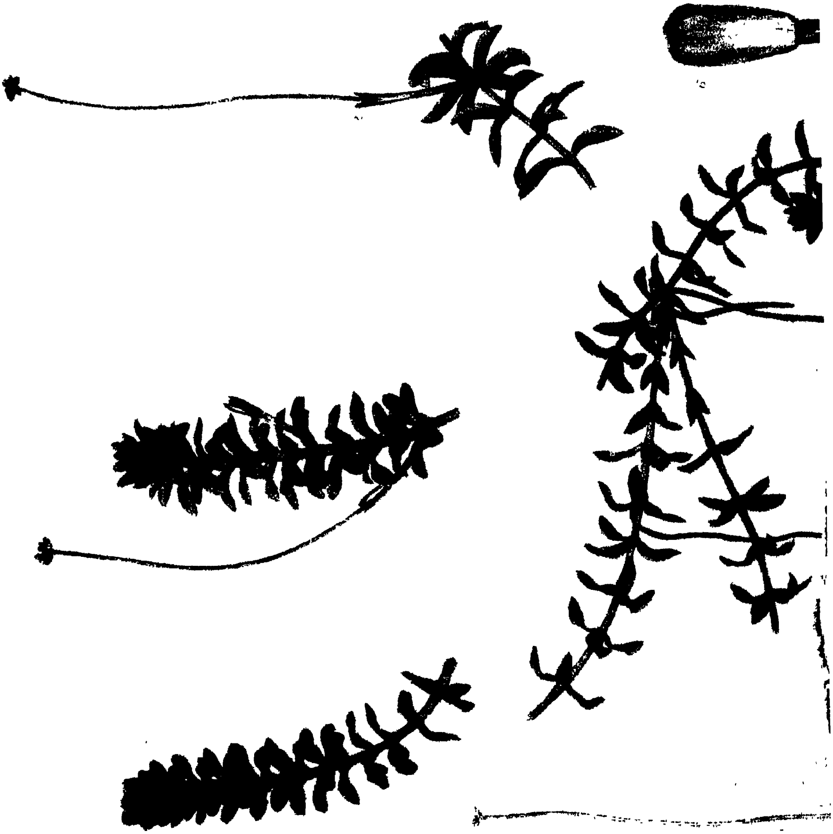
E. B. 808.

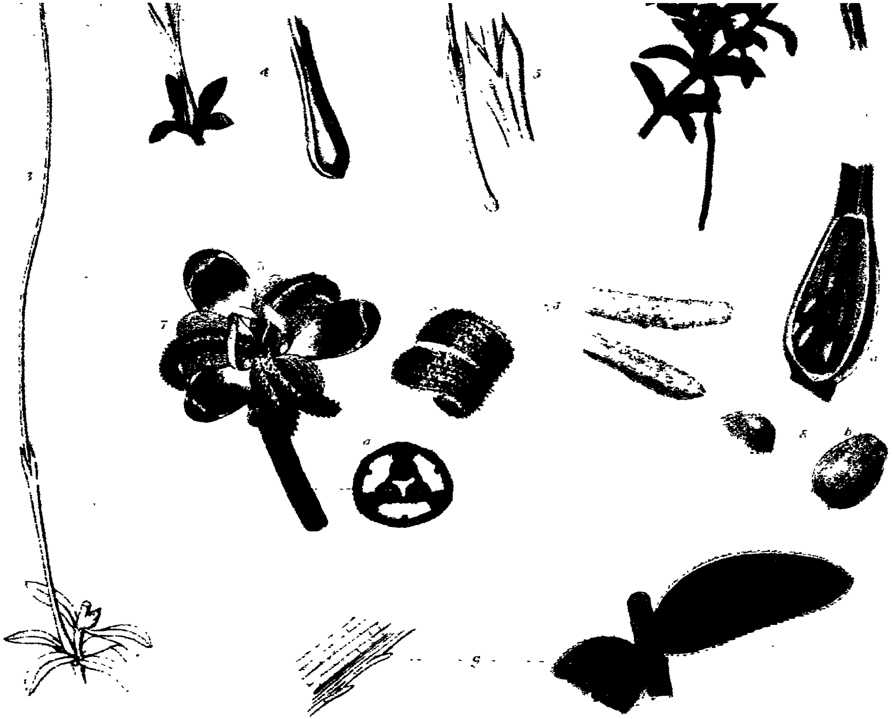
Hydrocharis Morsus-ranæ. Frog-bit.



E. B. 379.

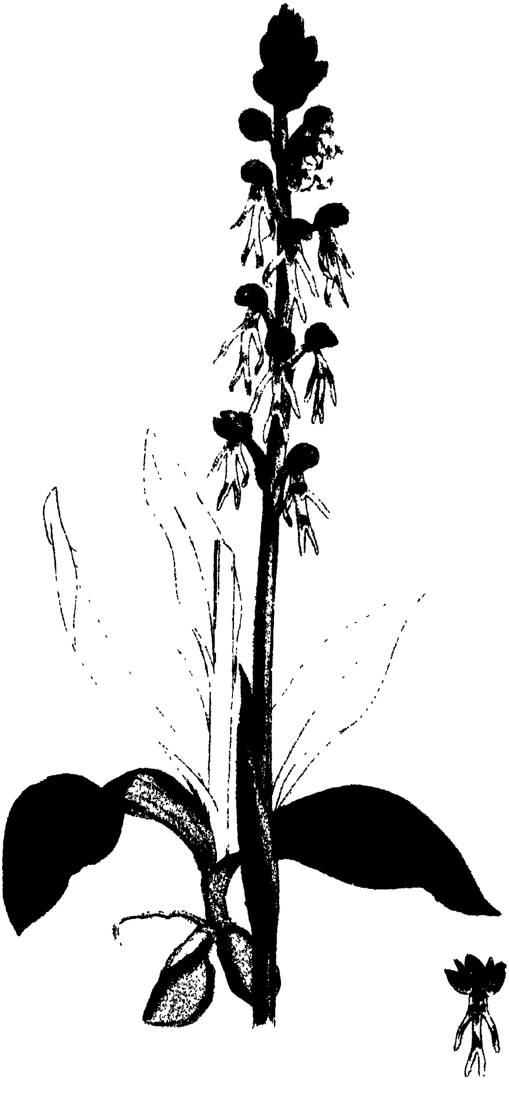
Stratiotes aloides. Water-Soldier.





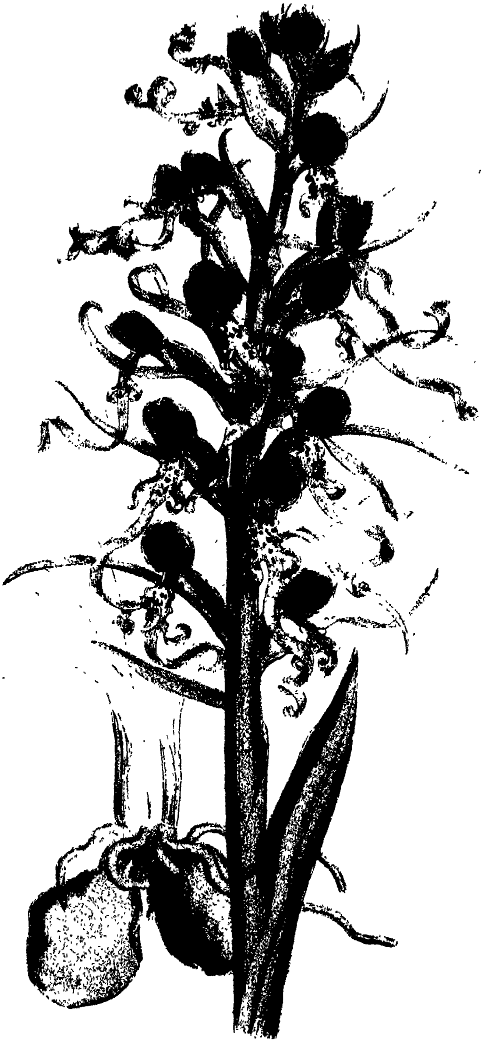
E. B. S. 2993.

Elodia Canadensis. Water-Thyme.



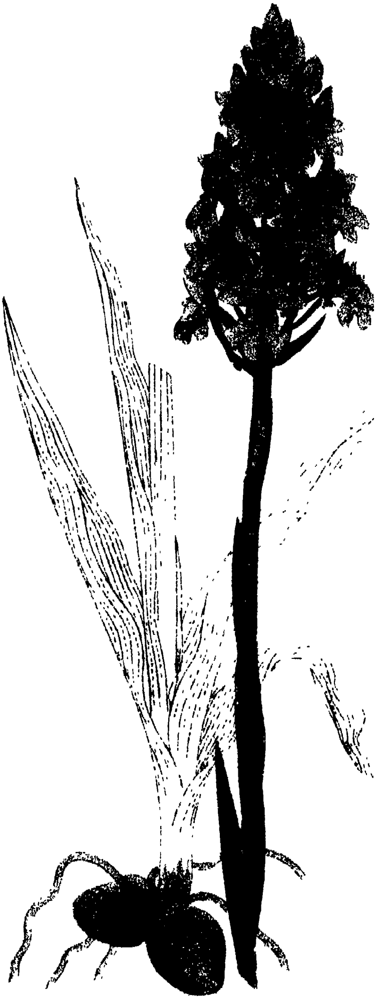
B. 29.

Aceras anthropophora. Man Orchis.



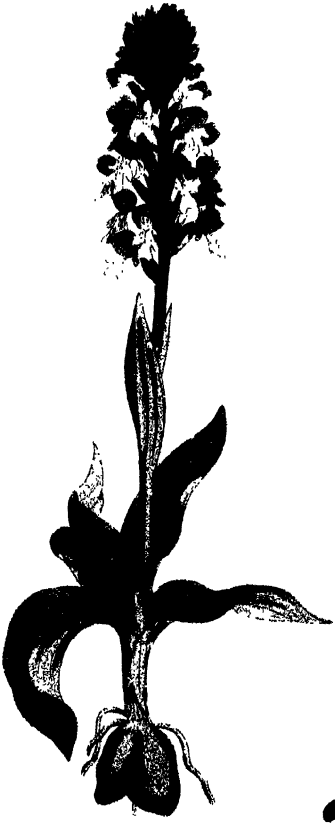
B. 24.

Orchis hircina. Lizard Orchis.



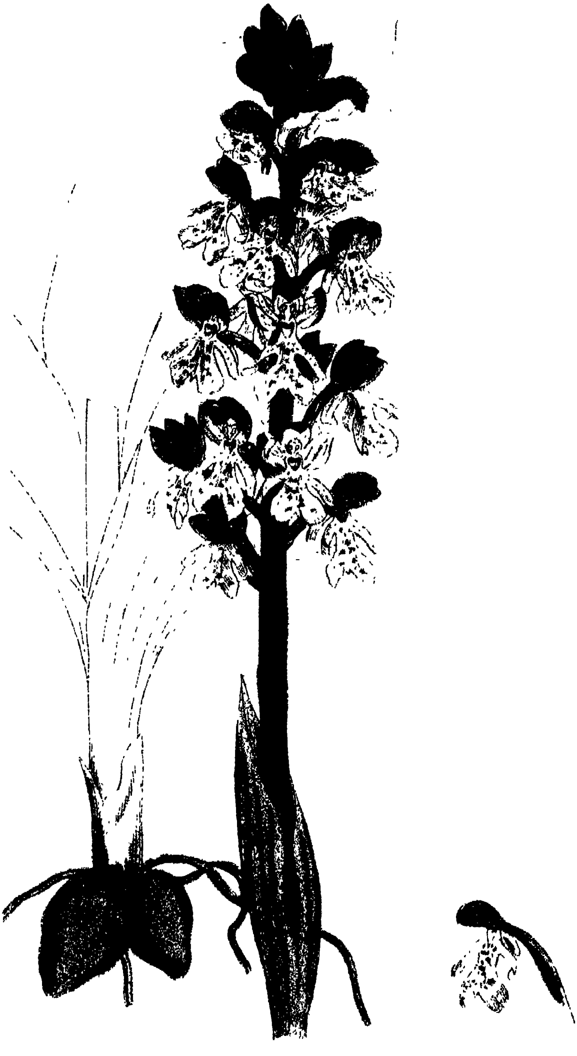
E. B. 110.

Orchis pyramidalis. Pyramidal Orchis.



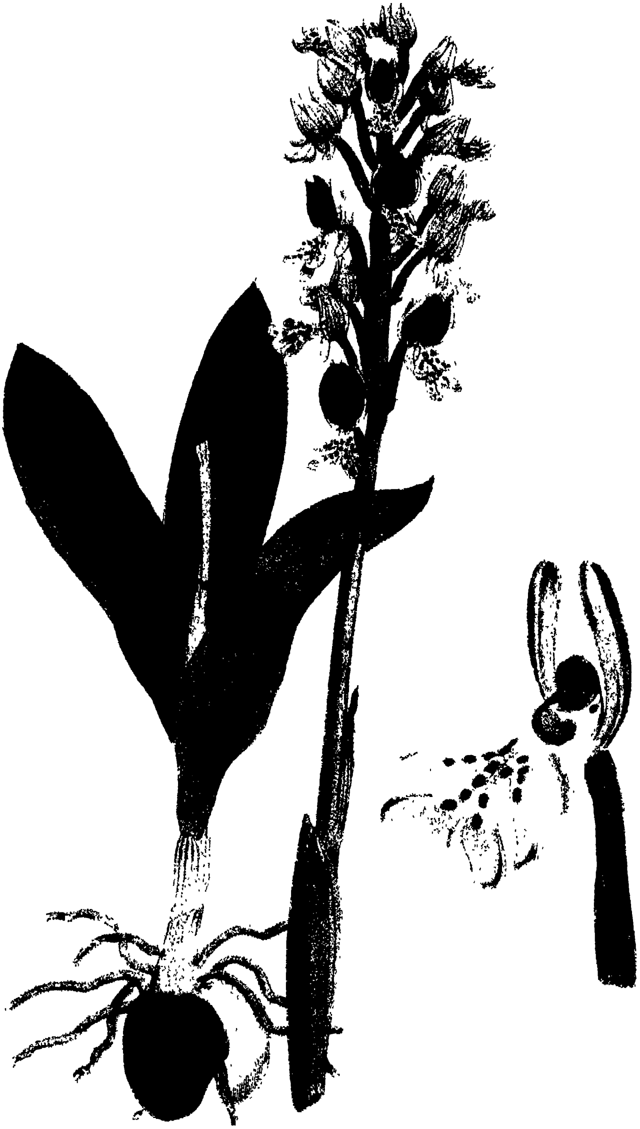
. *B*. 18.

Orchis ustulata. Dwarf dark-winged Orchis.



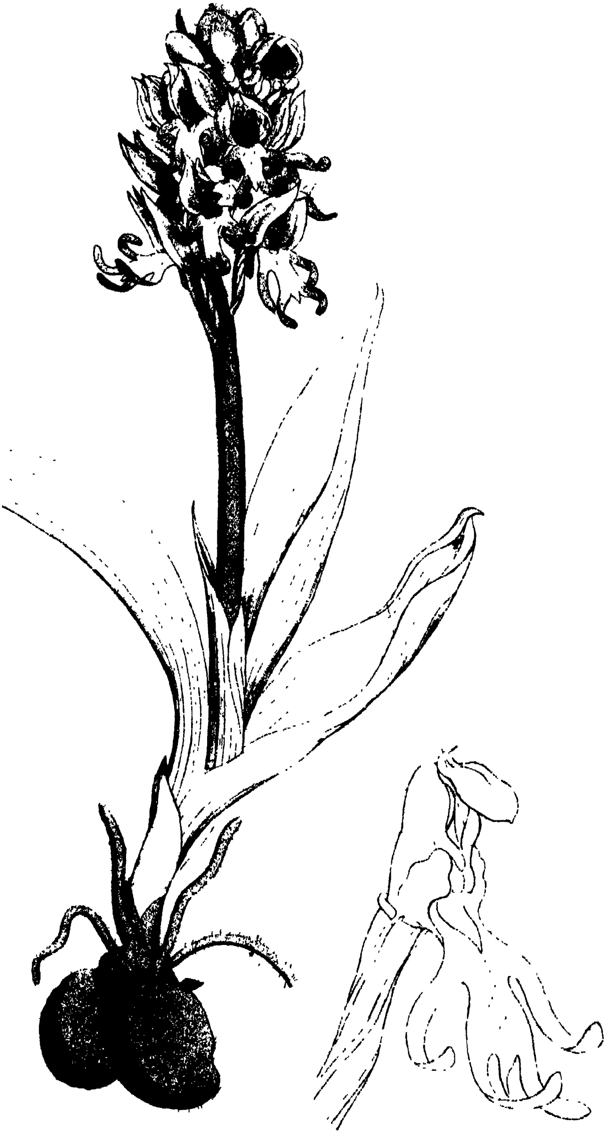
E. B. 16.

Orchis purpurea. Great dark-winged Orchis.



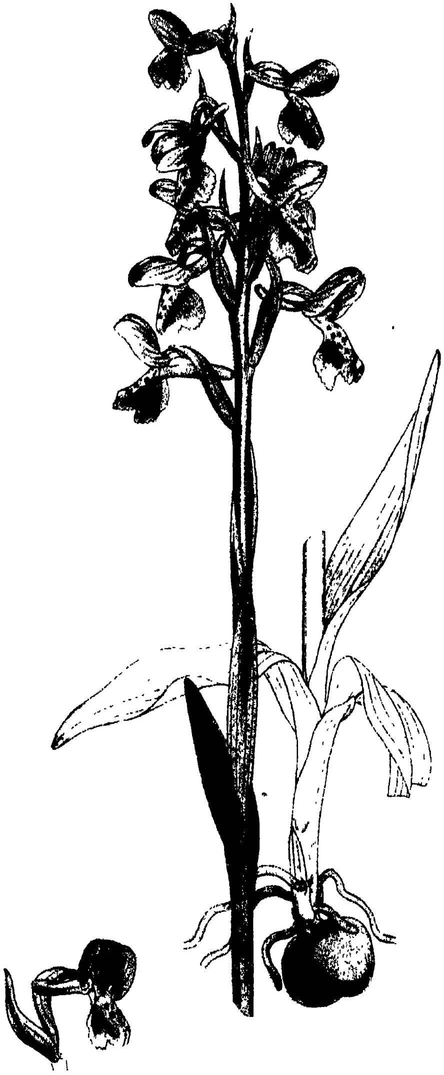
E. B. S. 2675.

Orchis militaris. Military Orchis



E. B. 1873.

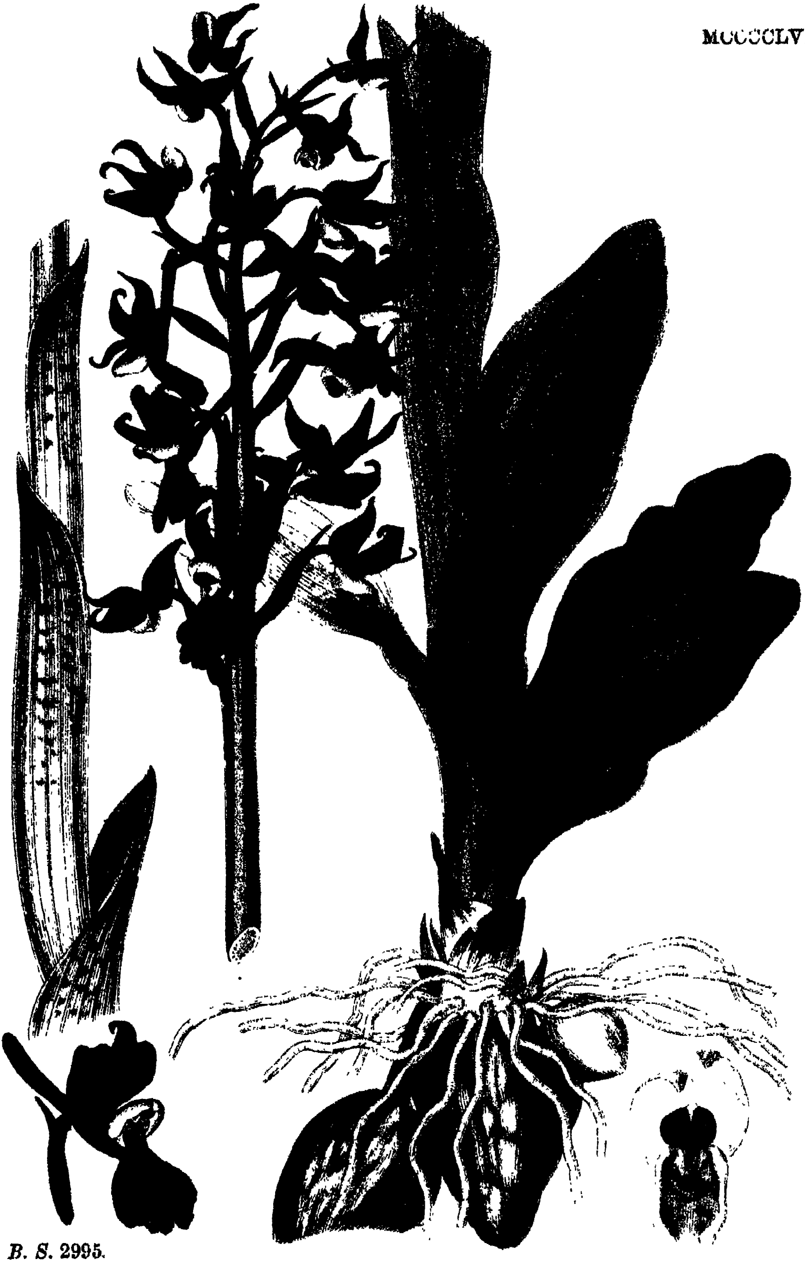
Orchis Simia. Monkey Orchis.



B..2059.

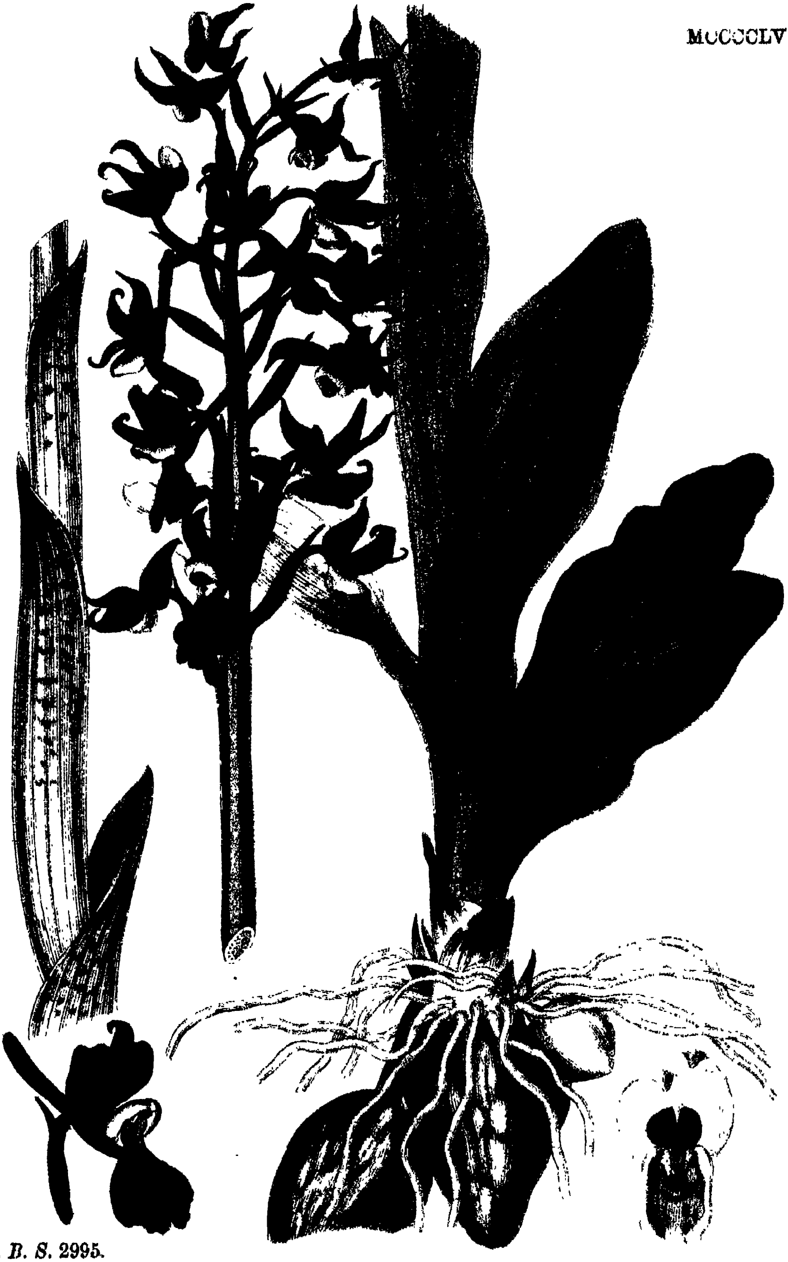
Orchis Morio. Green-winged Meadow Orchis.

MCCCCLV.



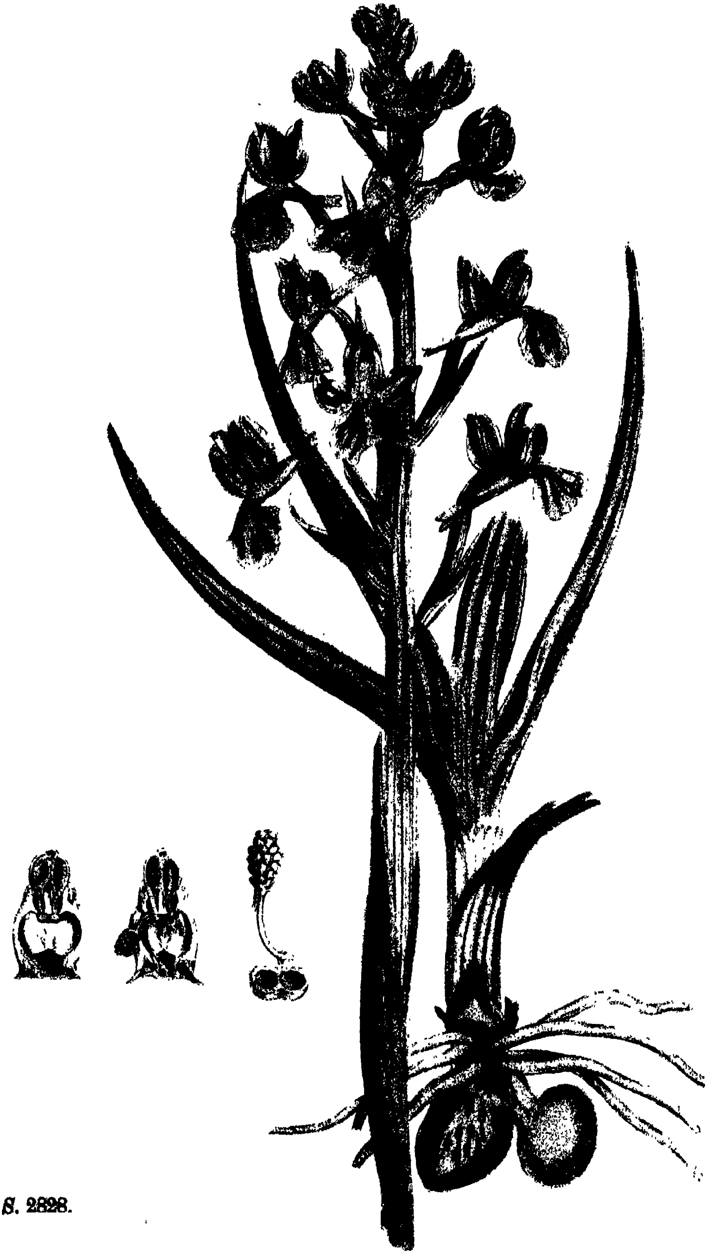
. *B. S.* 2995.

Orchis mascula. Early purple Orchis.



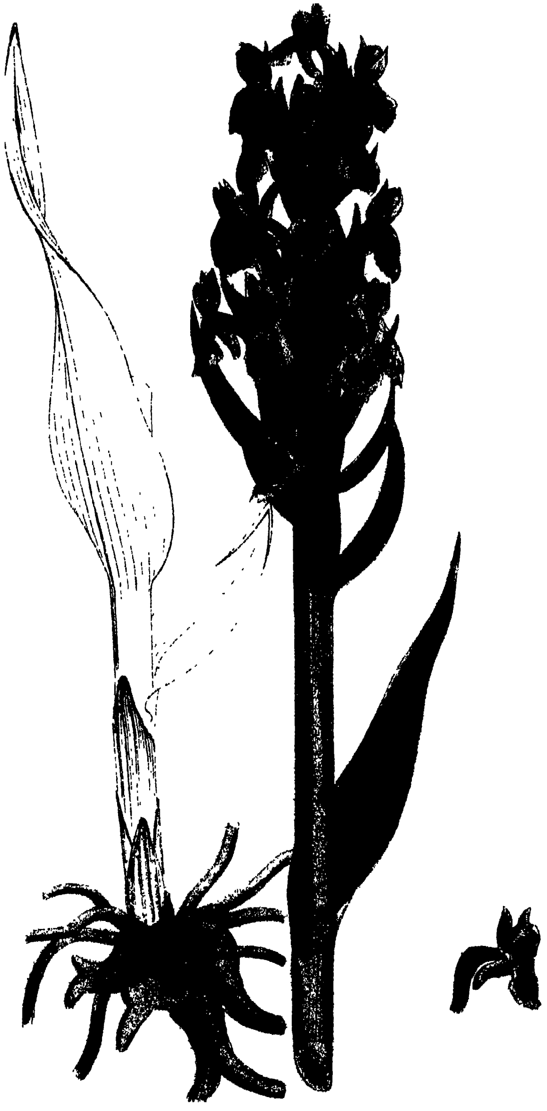
E. B. S. 2995.

Orchis mascula. Early purple Orchis.



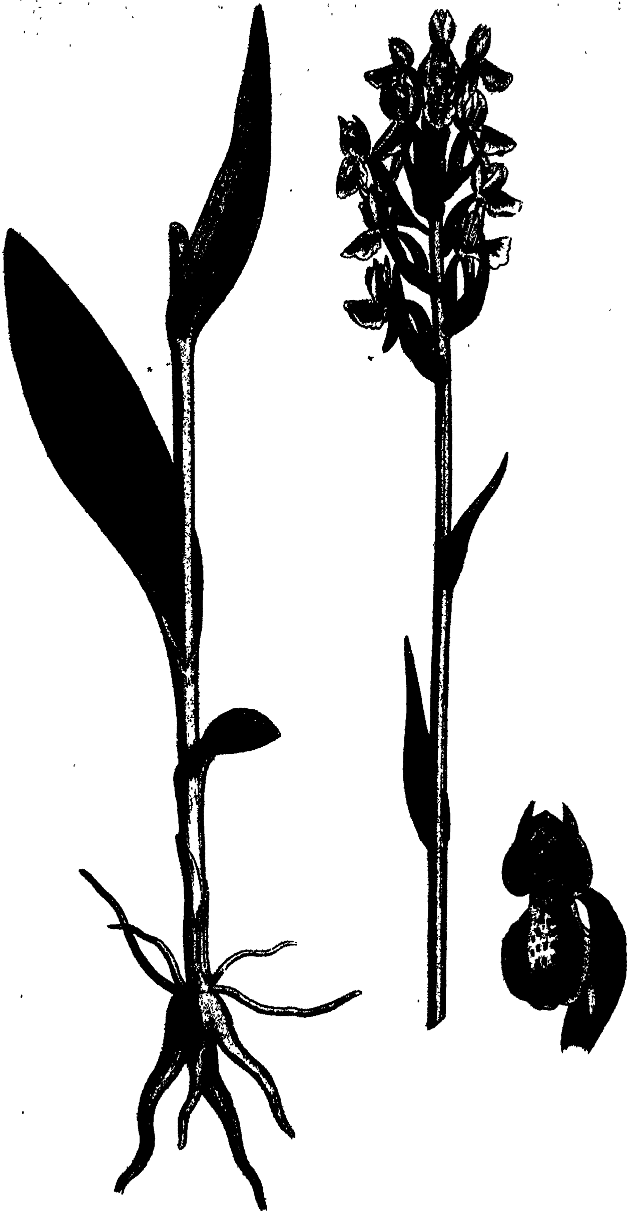
E. B. S. 2828.

Orchis laxiflora. Lax-flowered Orchis.



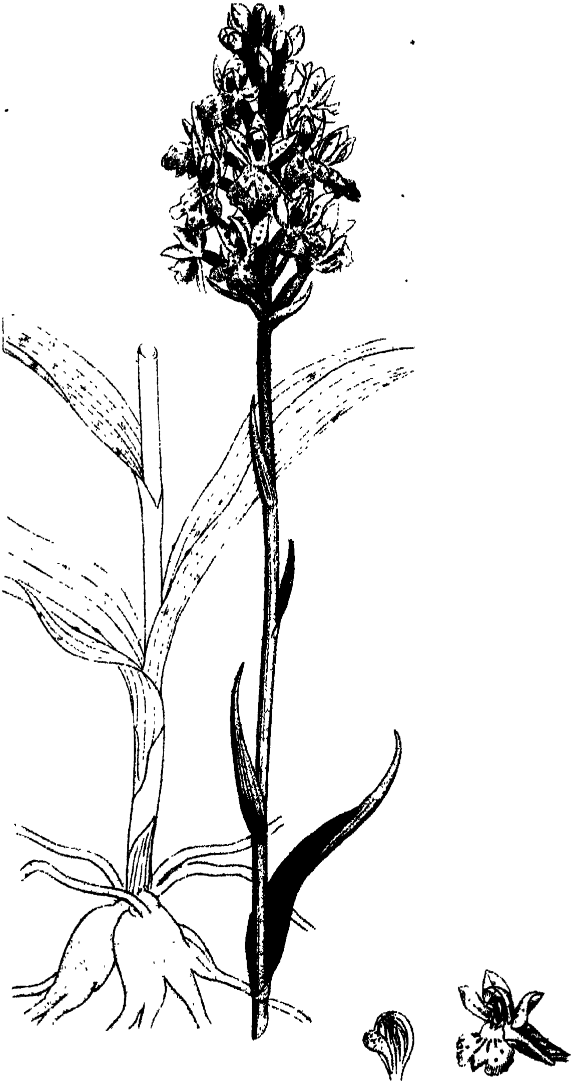
E. B. 2308.

Orchis incarnata. Common Marsh Orchis.



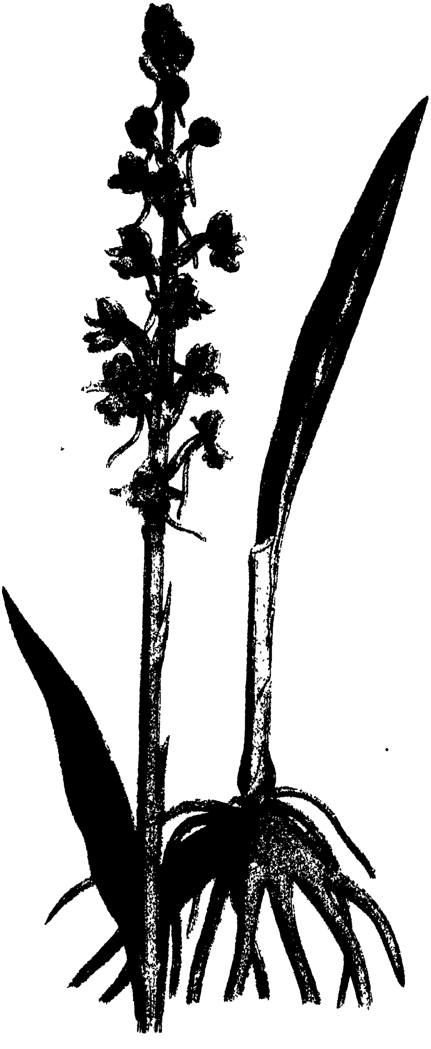
E. B. S. 2973.

Orchis latifolia. Broad-leaved Marsh Orchis.



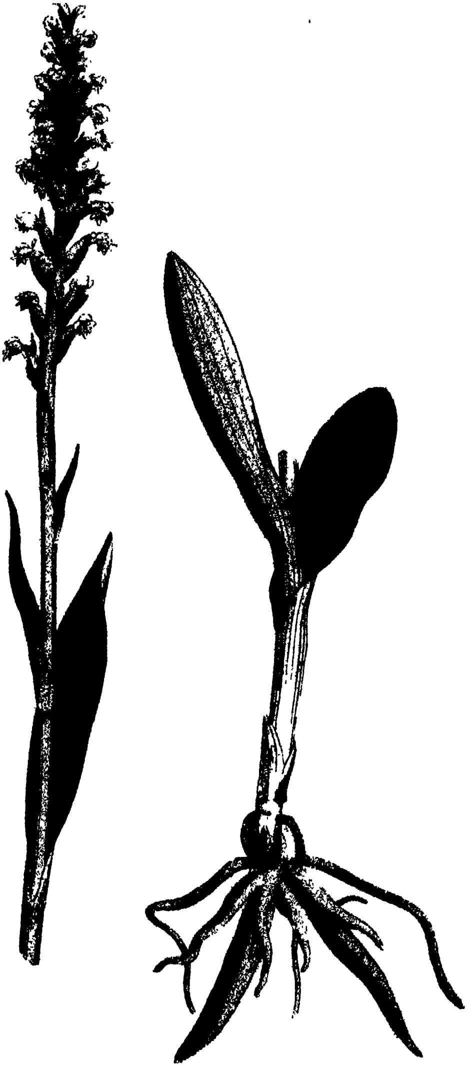
E. B. 632.

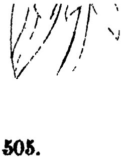
Orchis maculata. Spotted Palmate Orchis.



E. B. 10.

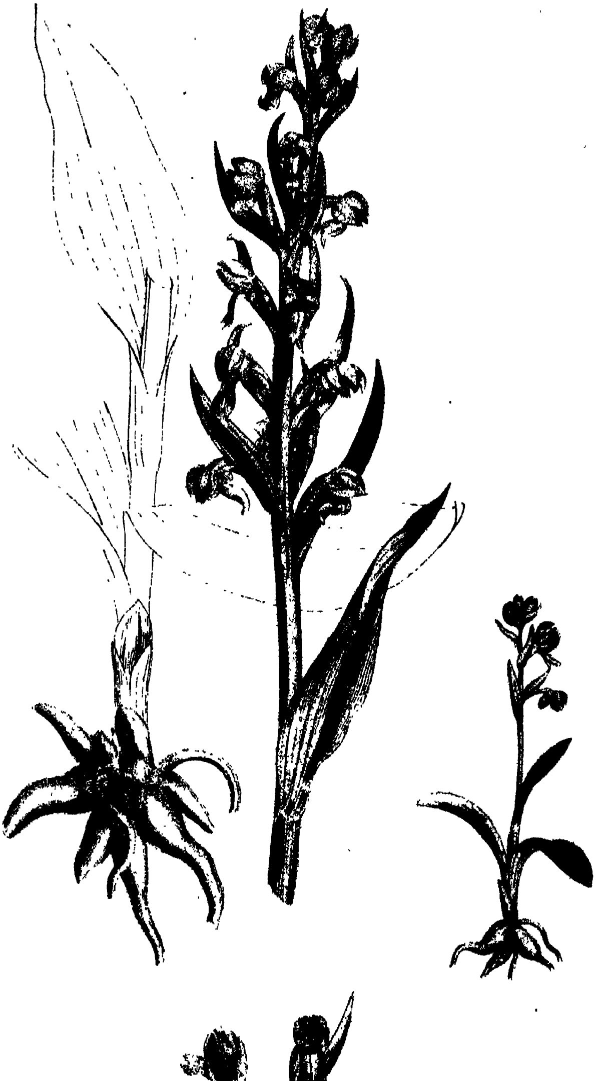
Gymnadenia conopsia. Fragrant Orchis.





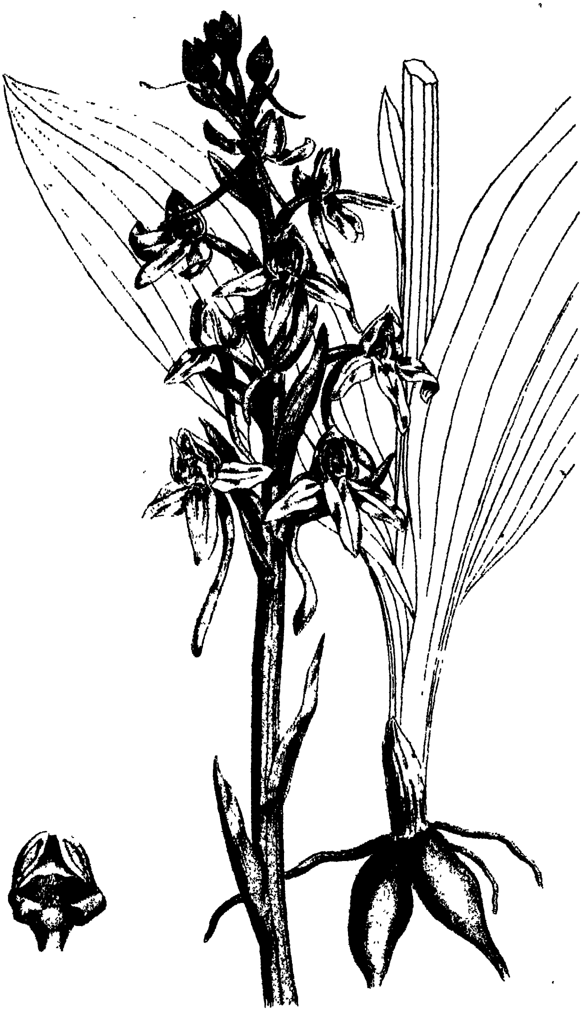
. *B*. 505.

Gymnadenia albida. Small White Orchis.

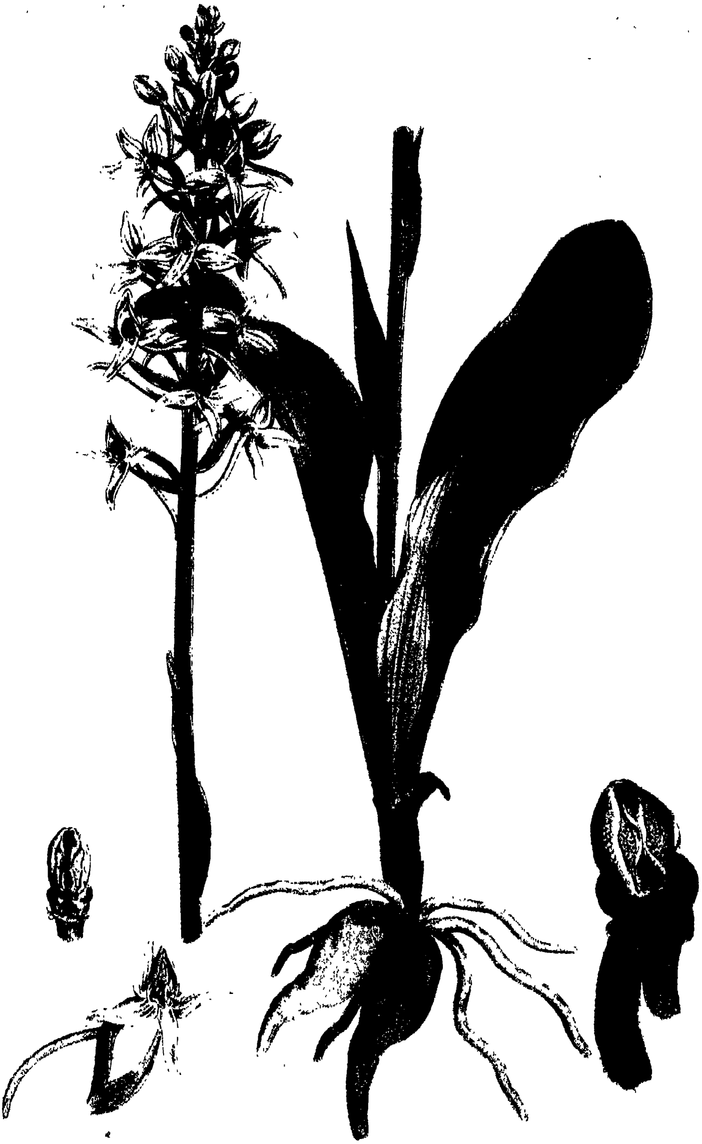


E. B. 94.

Habenaria viridis. Frog Orchis.



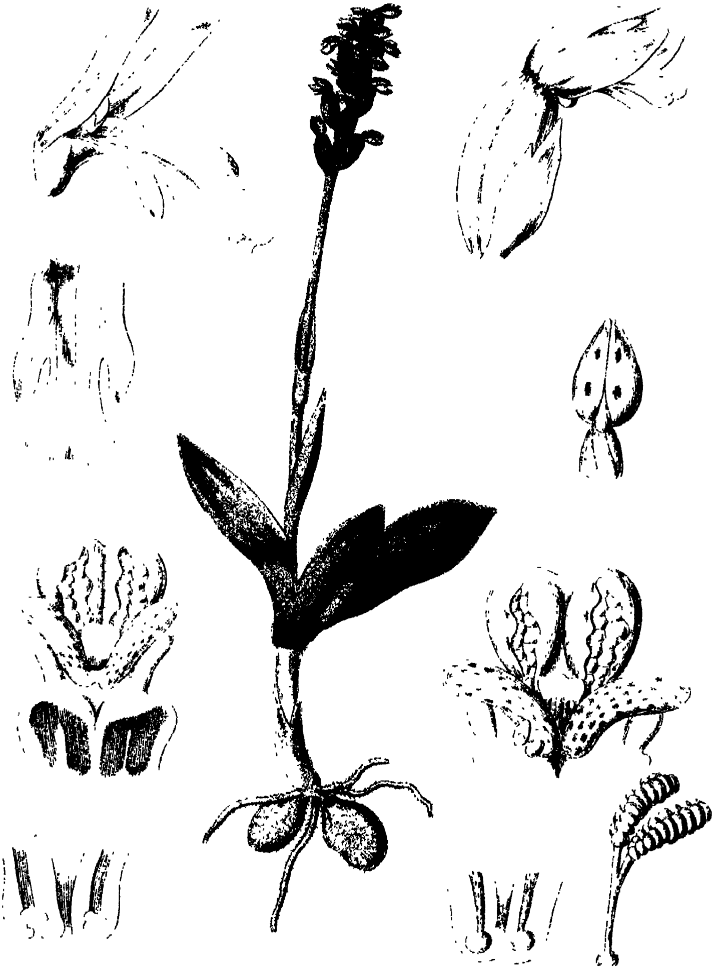
Habenaria eu-bifolia. Lesser Butterfly Orchis.



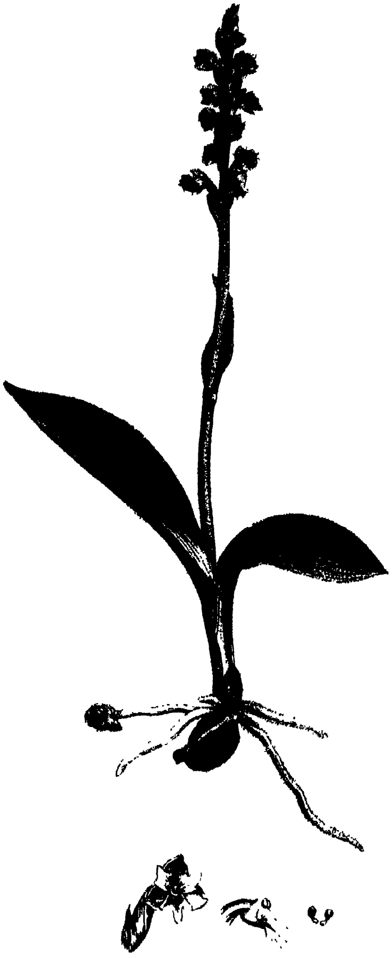
B. S. 2806.

Habenaria chlorantha. Greater Butterfly Orchis.

MCCCCLXV.

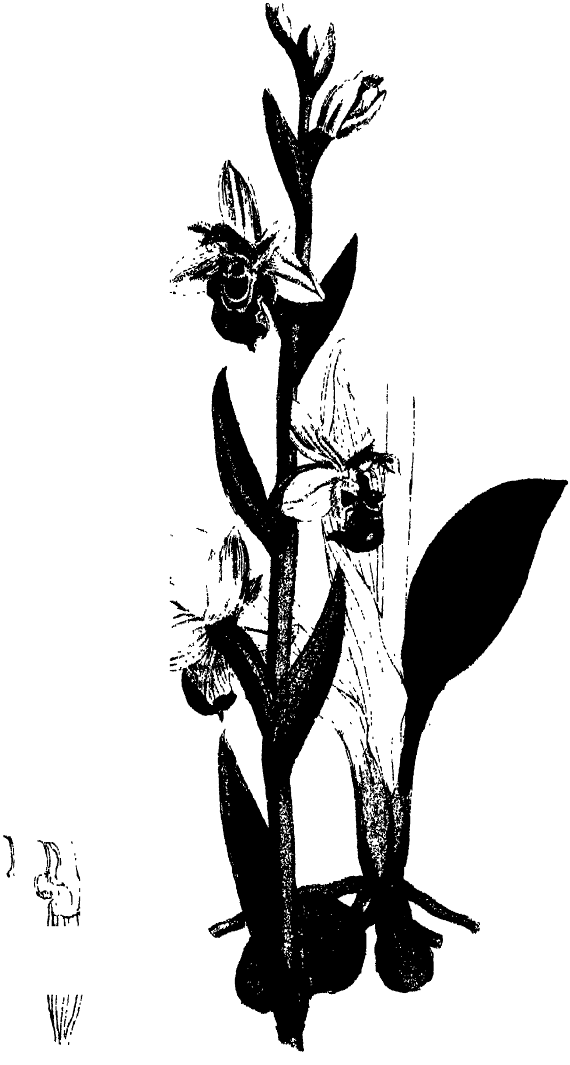


Neotinea intacta. Dense-flowered



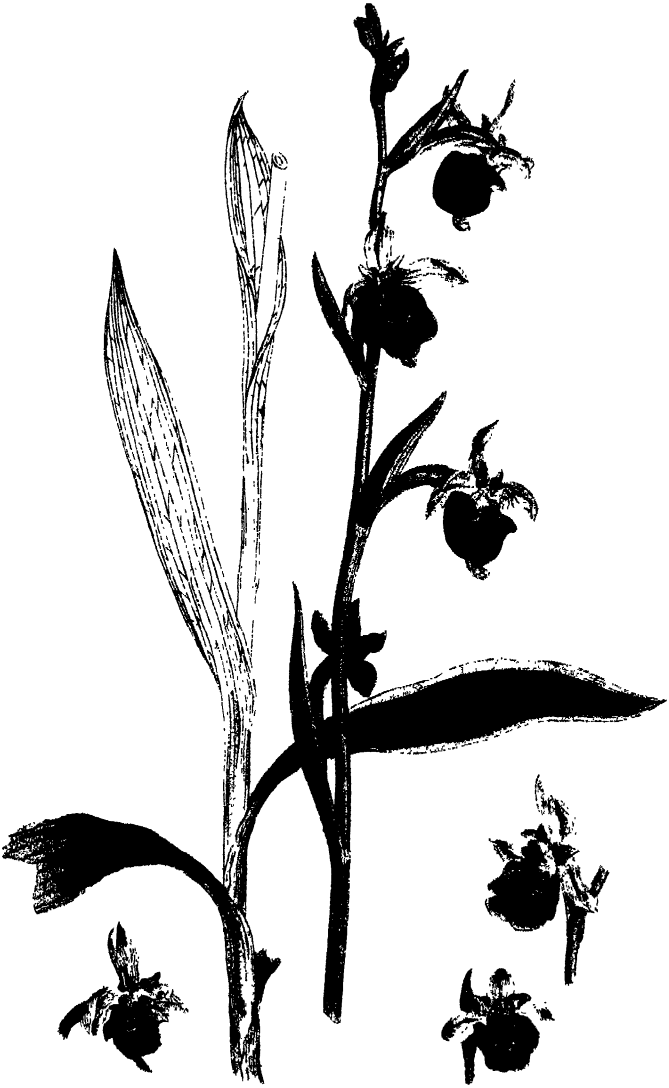
E. B. 71.

Herminium Monorchis. Musk-Orchis.



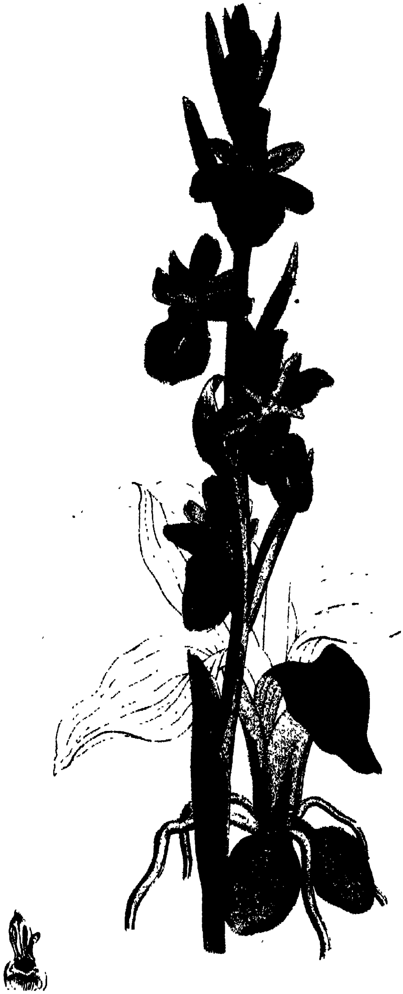
E. B. 383.

Ophrys apifera. Bee Orchis.



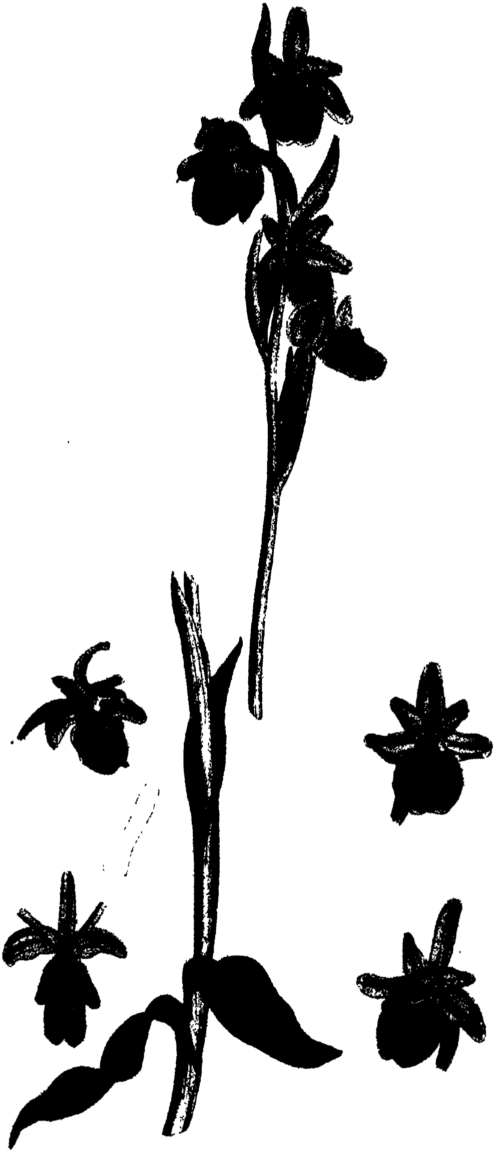
S. 2596.

Ophrys arachnites. Late Spider Orchi



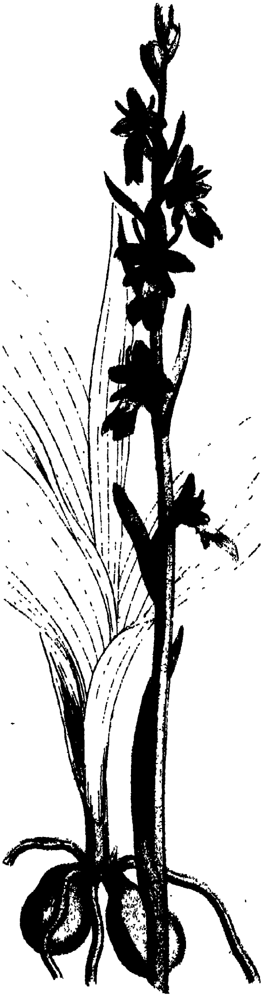
E. B. 65.

Ophrys aranifera, var. genuina. Early Spider Orchis, var.



E. B. S. 2649.

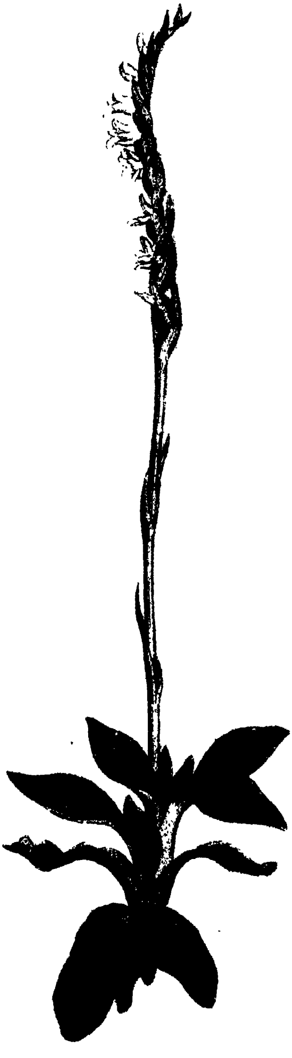
Ophrys aranifera, var. fucifera. Early Spider Orchis, var.



. 64.

Ophrys muscifera. Fly Orchis.

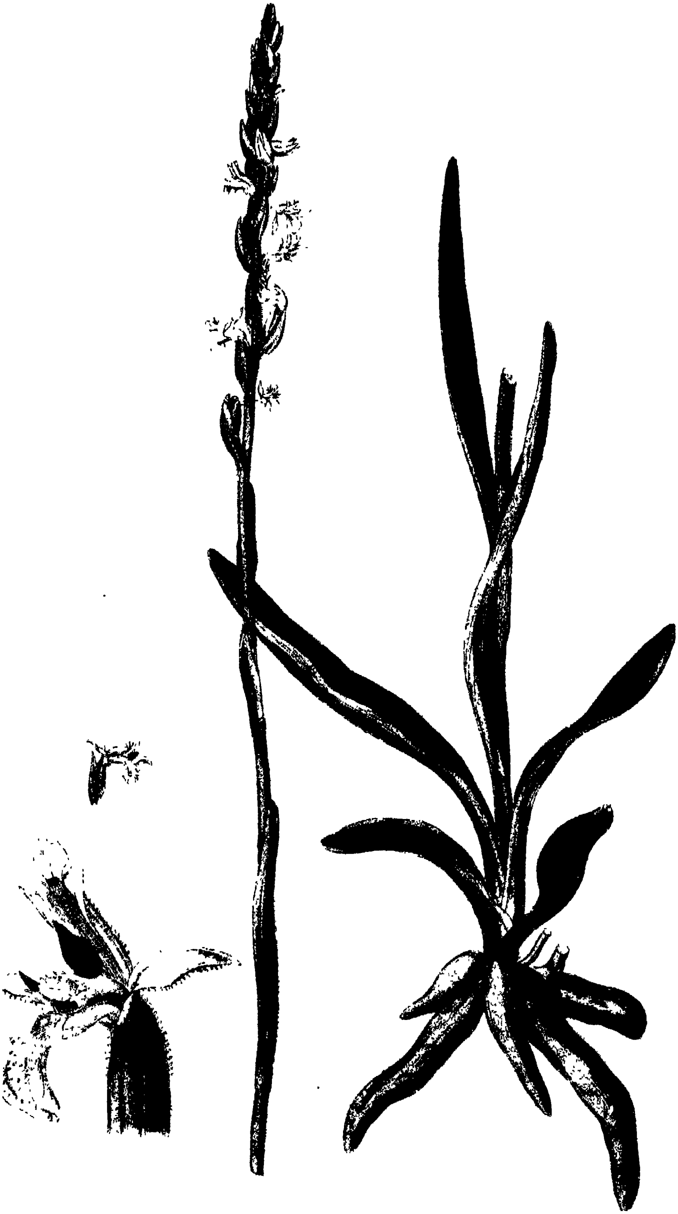
MCCCCLXXII.



B. 541.

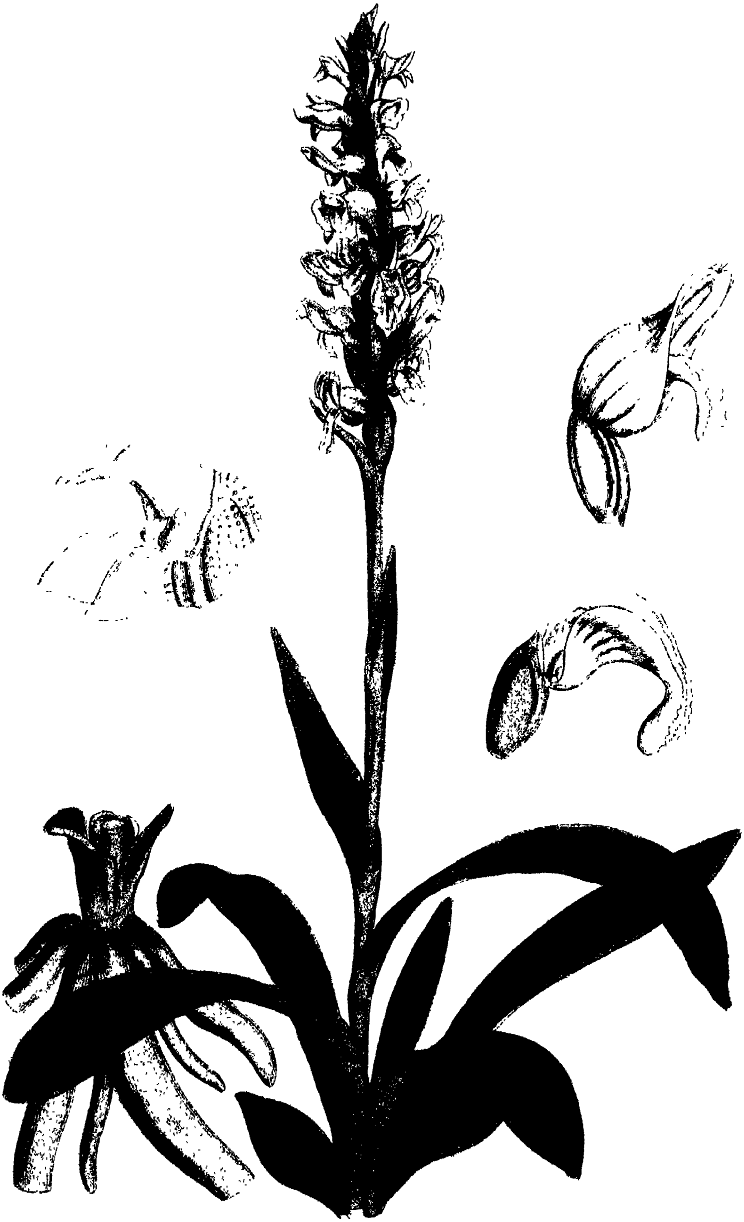
Spiranthes autumnalis. Autumnal Lady's-tresses.

MCCCCLXXIII.

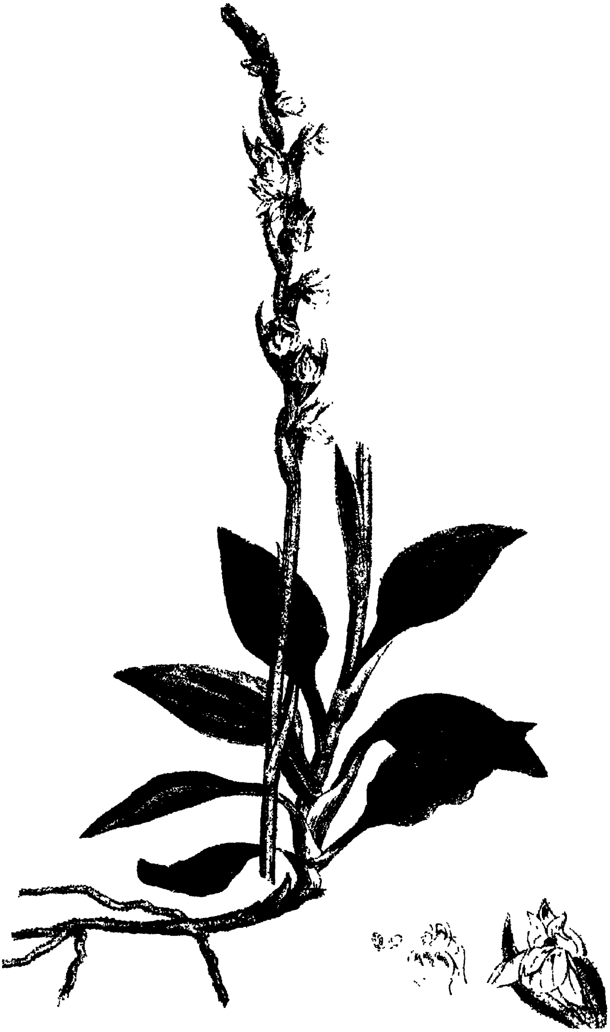


S. 2817.

Spiranthes æstivalis.   Summer

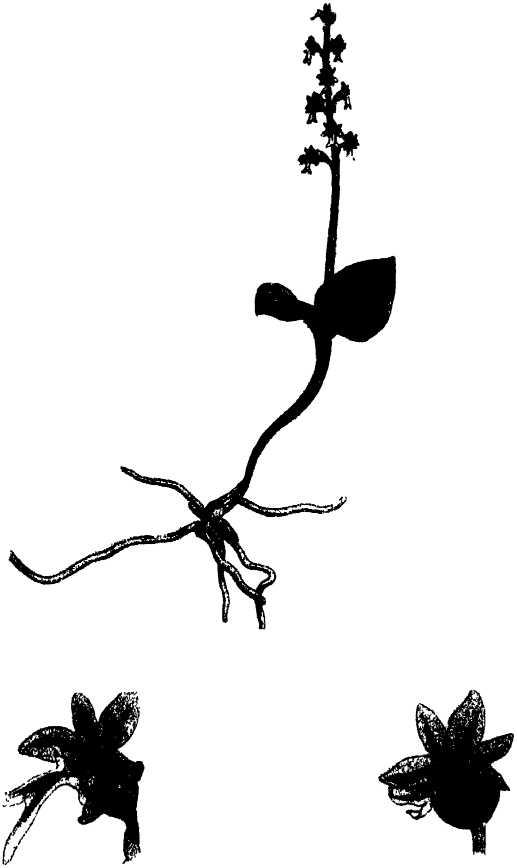


Spiranthes gemmipara. Three-ranked Lady's-tresses.



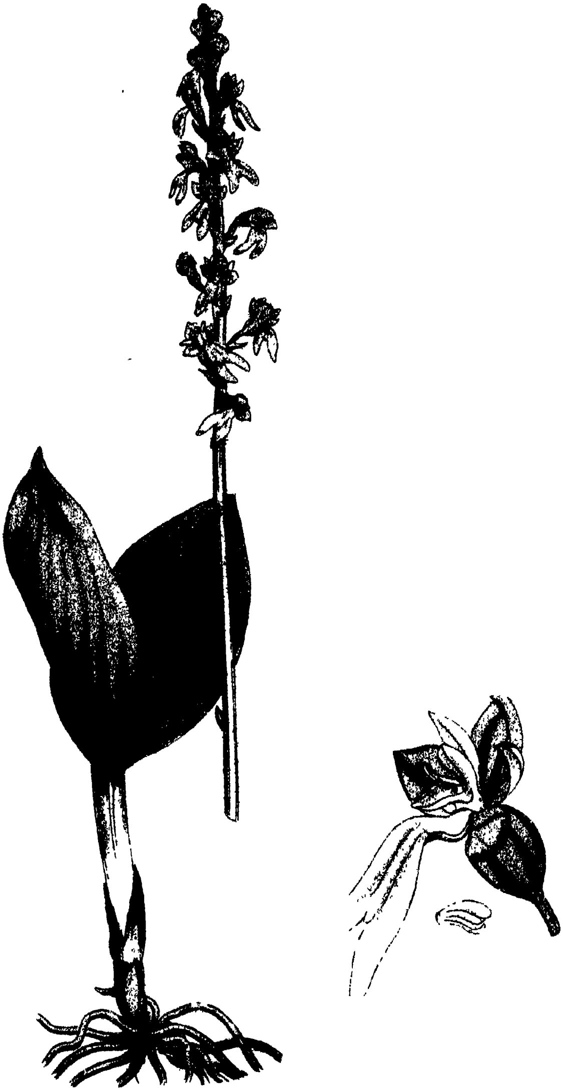
Goodyera repens. Creeping Lady's-tresses.

MCCCCLXXVI.



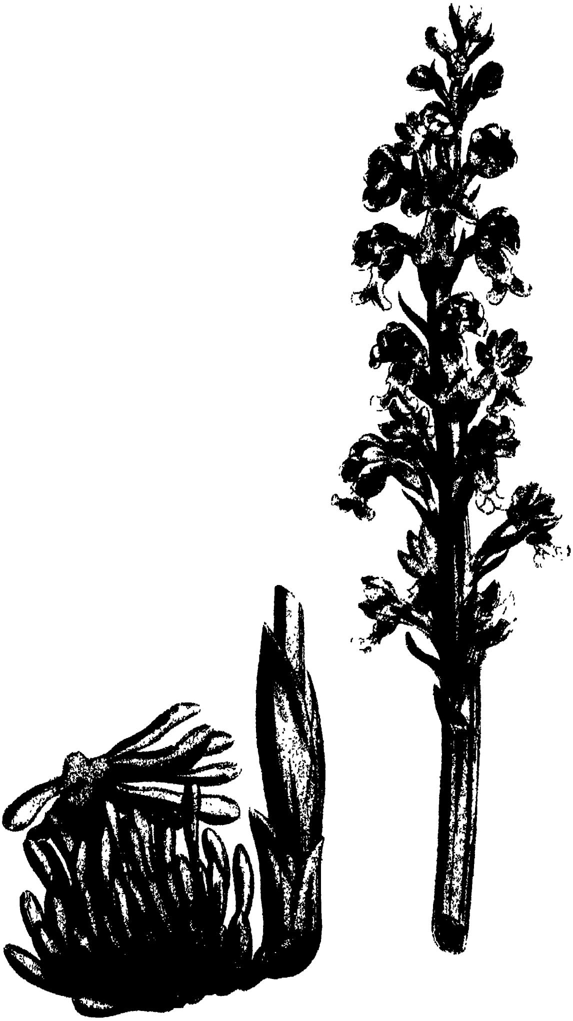
E. B. 358.

Listera cordata. Lesser Tway-blade.



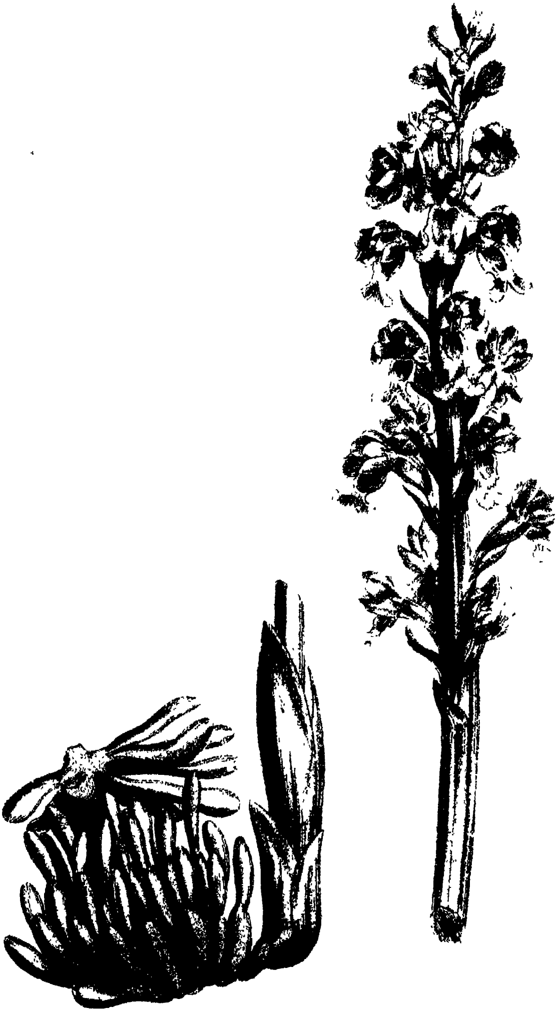
B. 1548.

Listera ovata. Common Tway-blade.



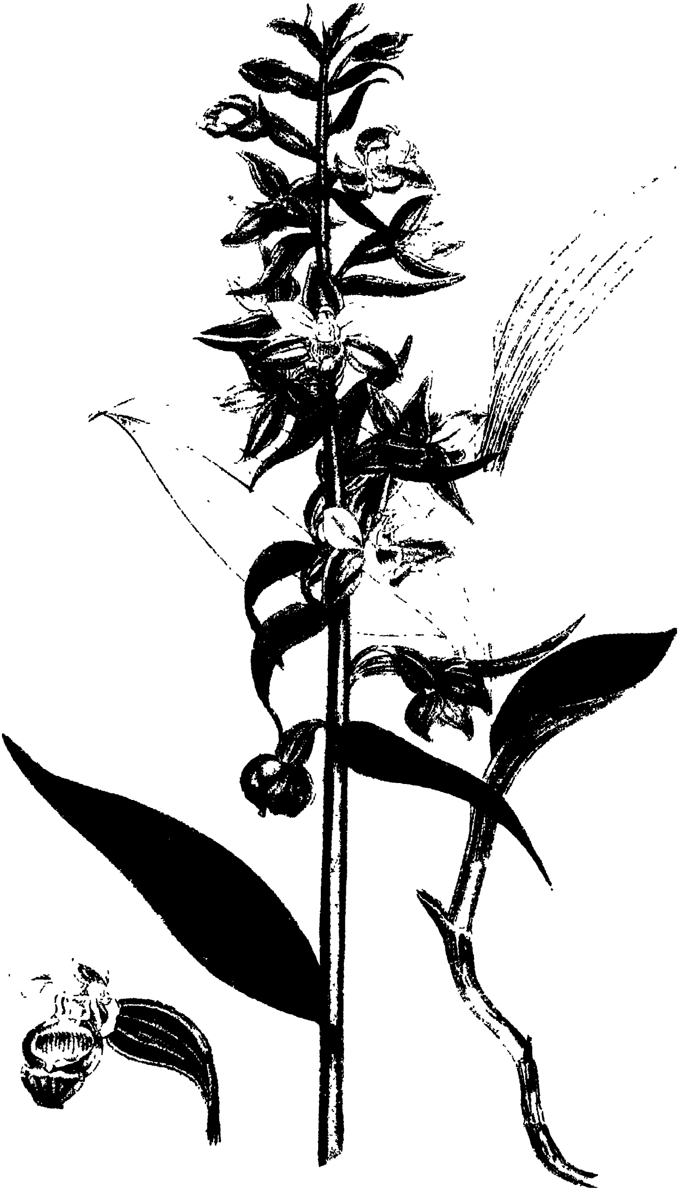
E. B.

Neottia Nidus-avis. Bird's-nest Orchis.

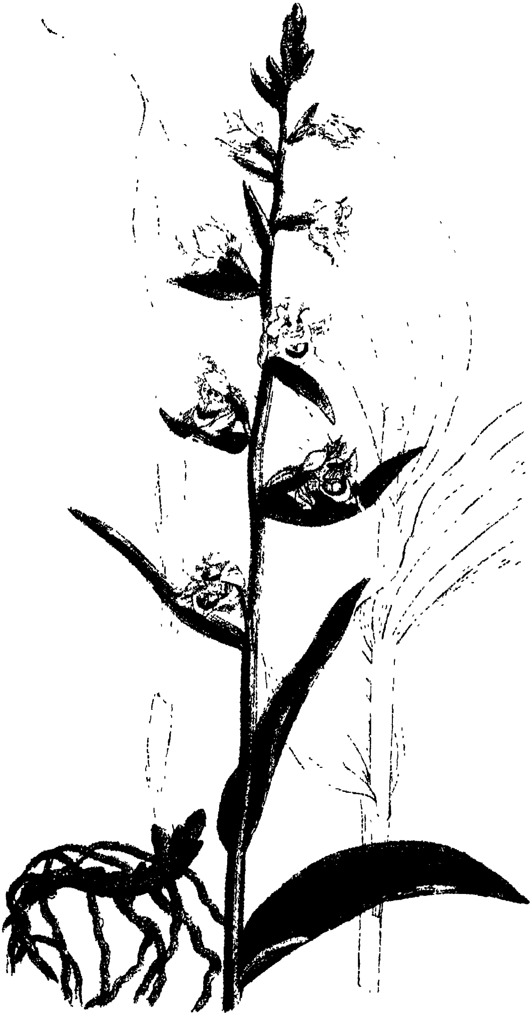


E. B. 48.

Neottia Nidus-avis.   Bird's-nest Orchis.

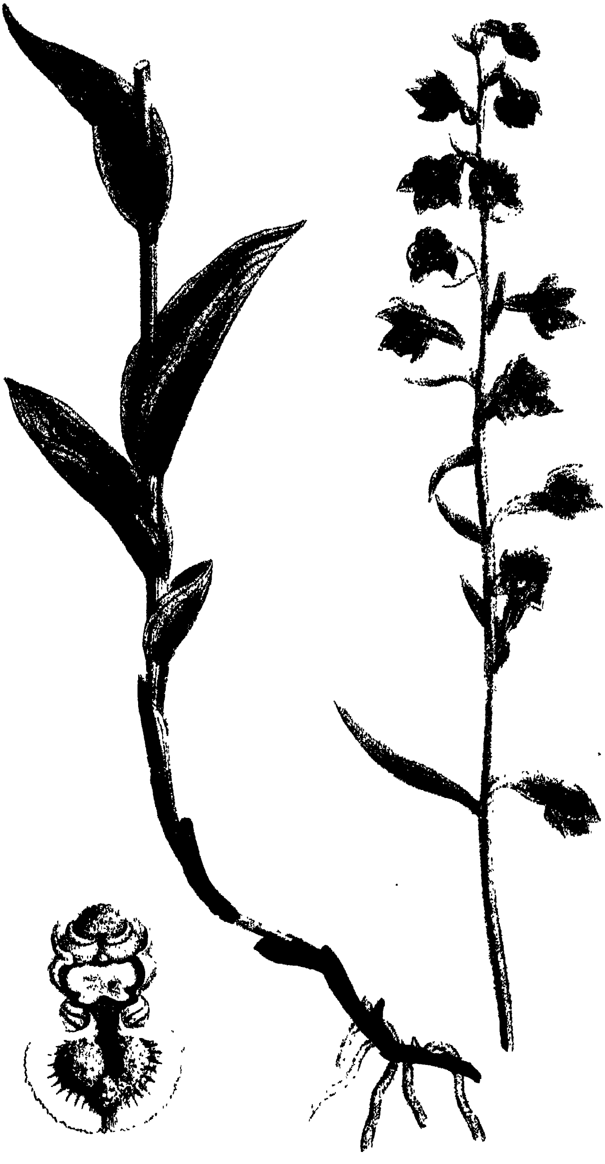


Epipactis media. Narrow-leaved Helleborine.



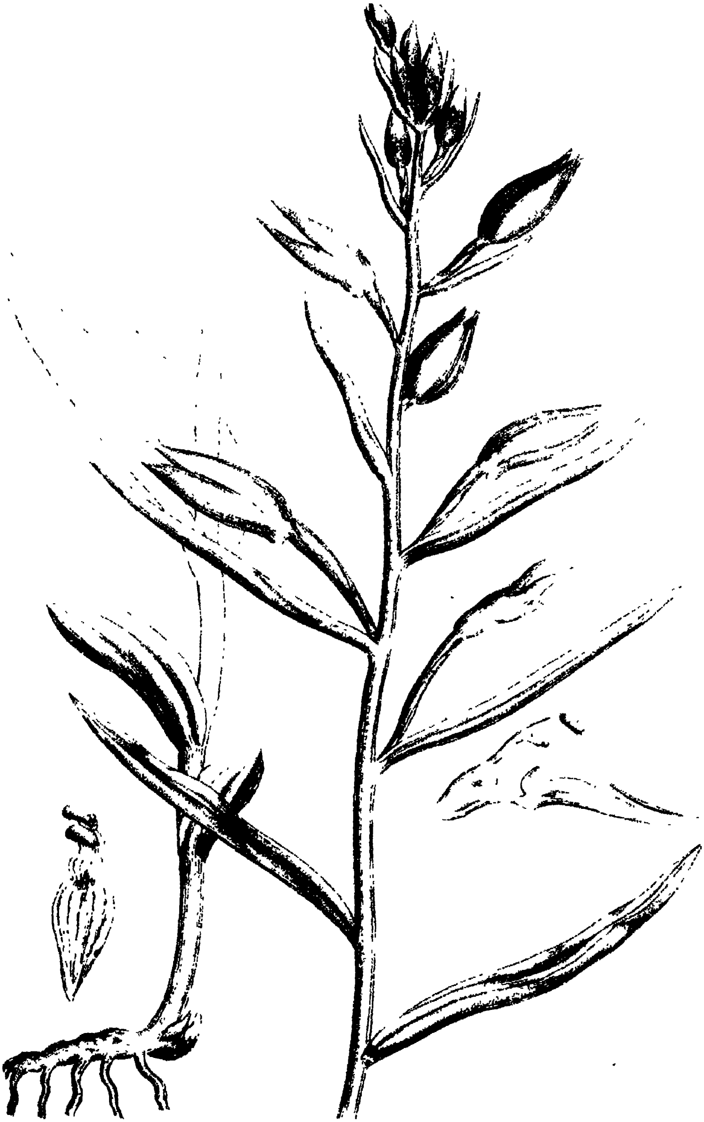
E. B. 269.

Epipactis latifolia. *Broad-leaved Helleborine.*

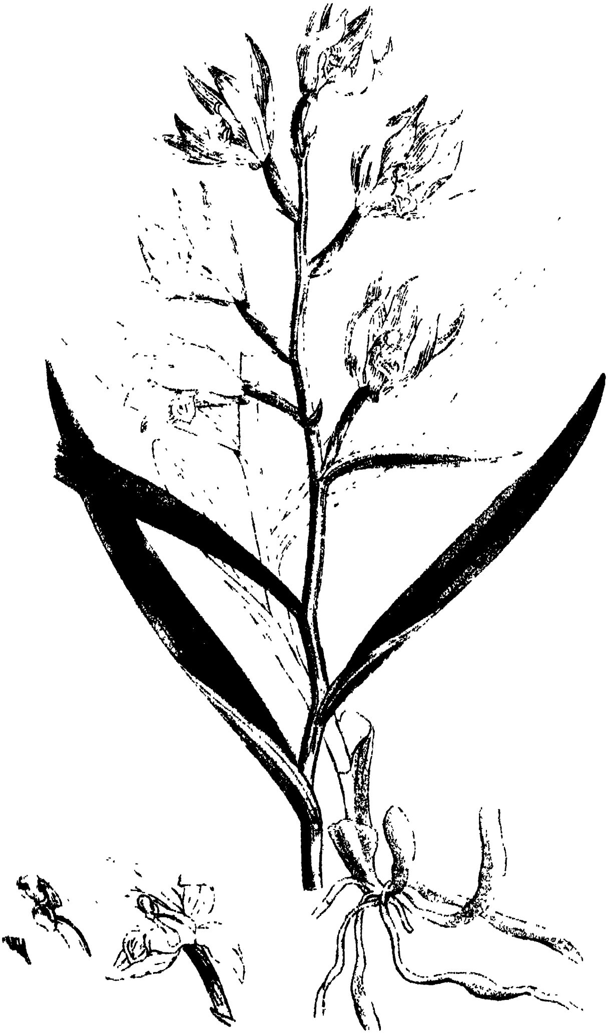


𝔈. *B. S.* 2884.

Epipactis atrorubens. Oval-leaved Helleborine.

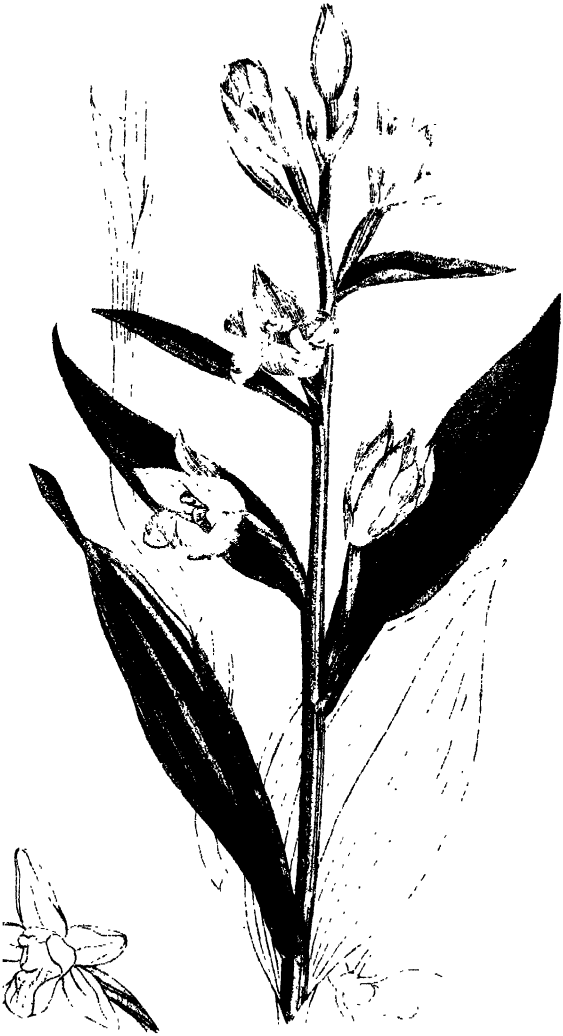


Cephalanthera rubra. Red Helleborine.



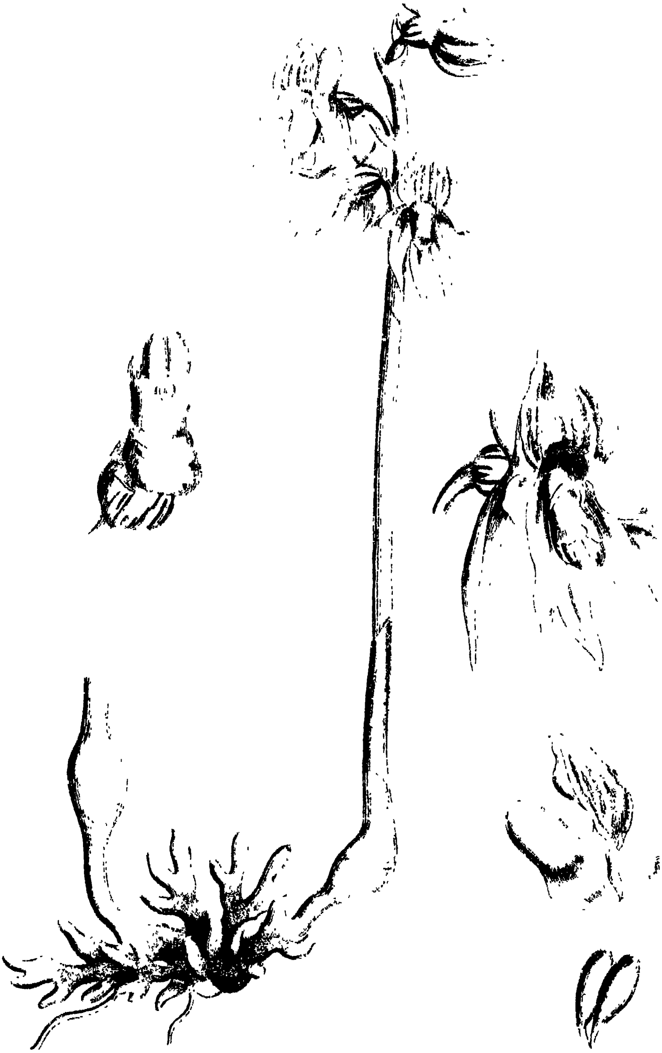
E. B. 494.

Cephalanthera ensifolia. Long-leaved Helleborine.

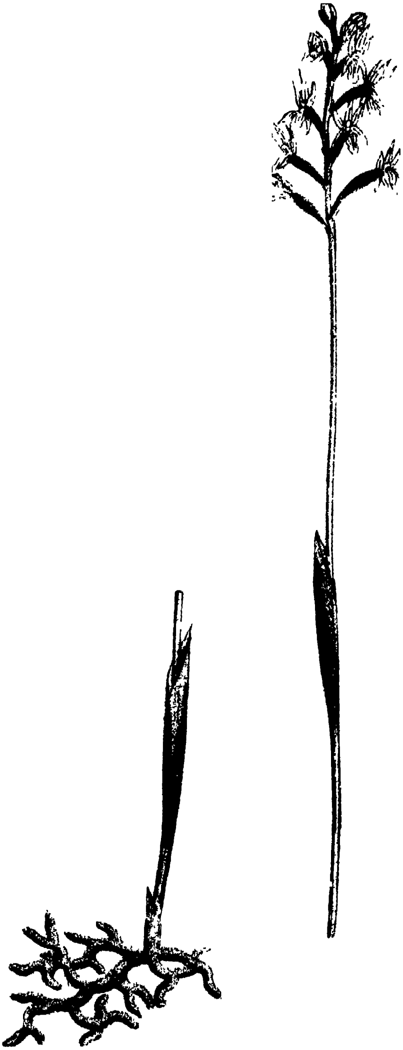


E. B. 271

Cephalanthera grandiflora. White Helleborine.

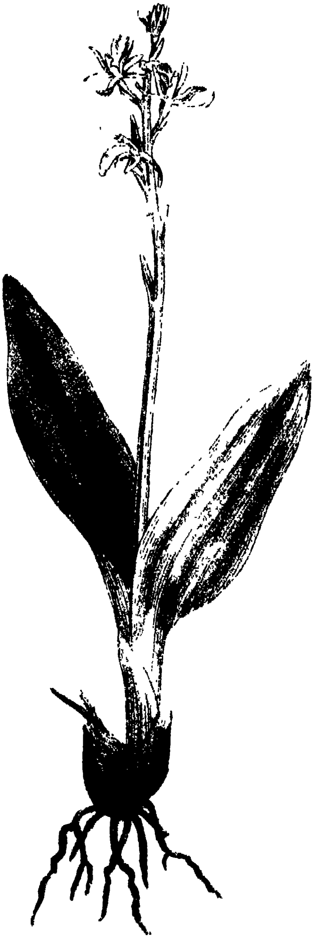


Epipogium aphyllum. Leafless Epipogium.



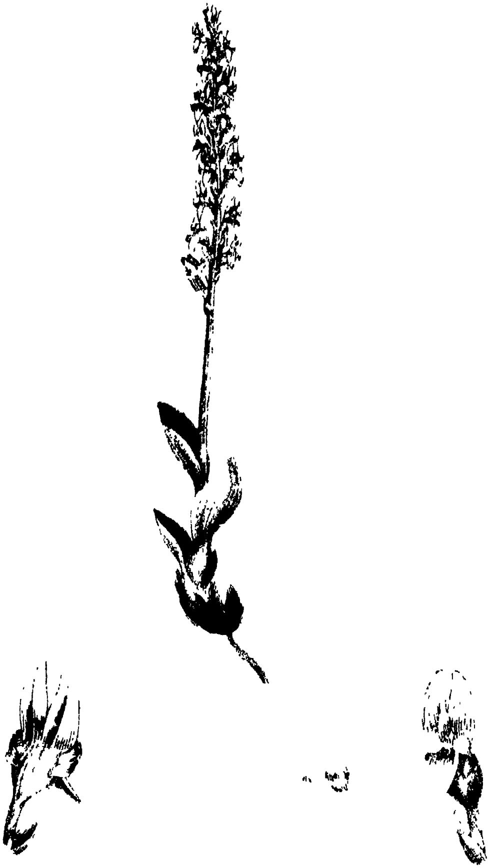
E. B. 1547.

Corallorrhiza innata. Common Coral-root.



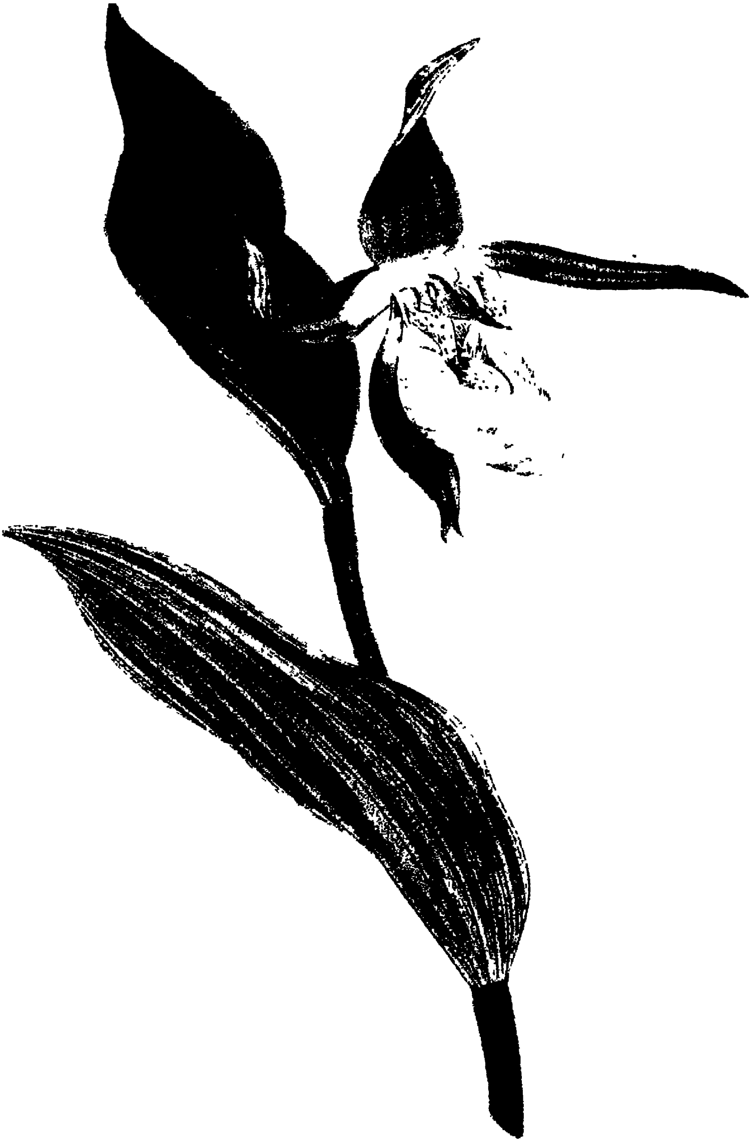
E. B. 47.

Liparis Löselii. Fen Orchis.

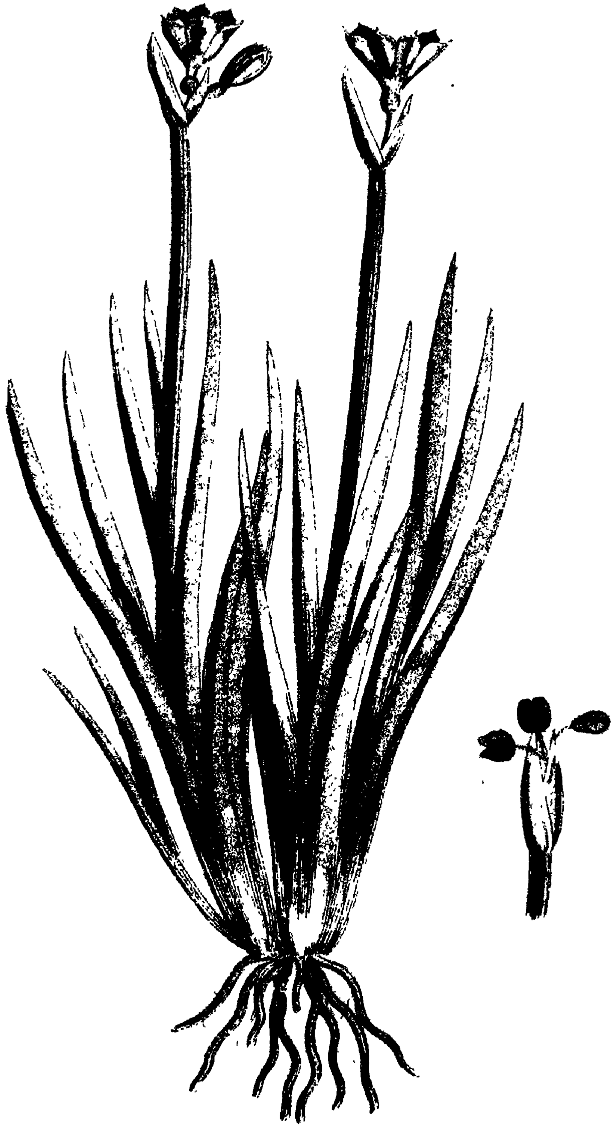


E. B. 72.

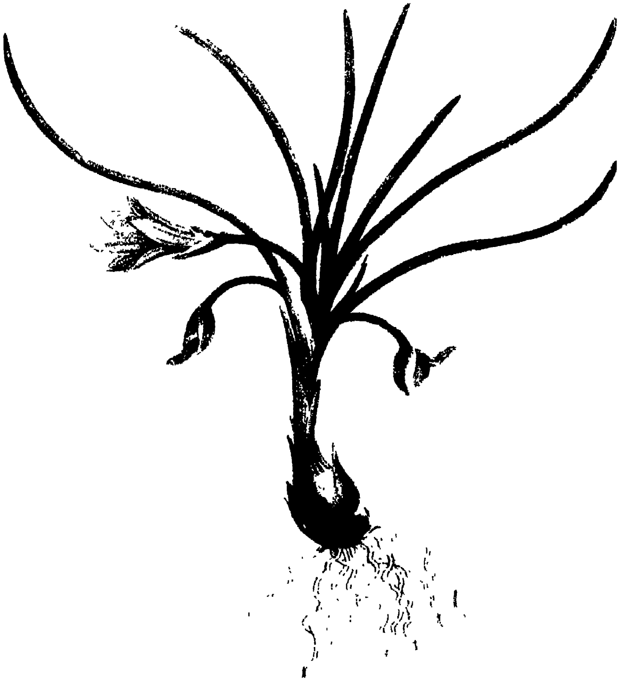
Malaxis paludosa. Bog Orchis



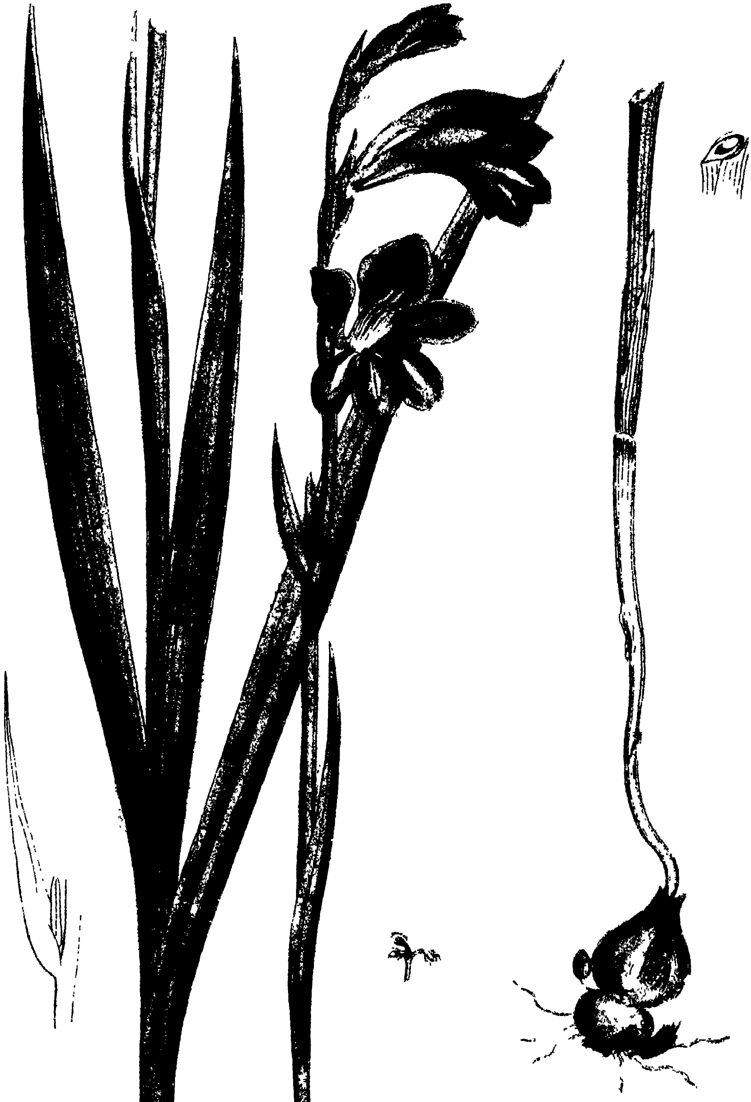
Cypripedium Calceolus. Common Lady's-slipper.



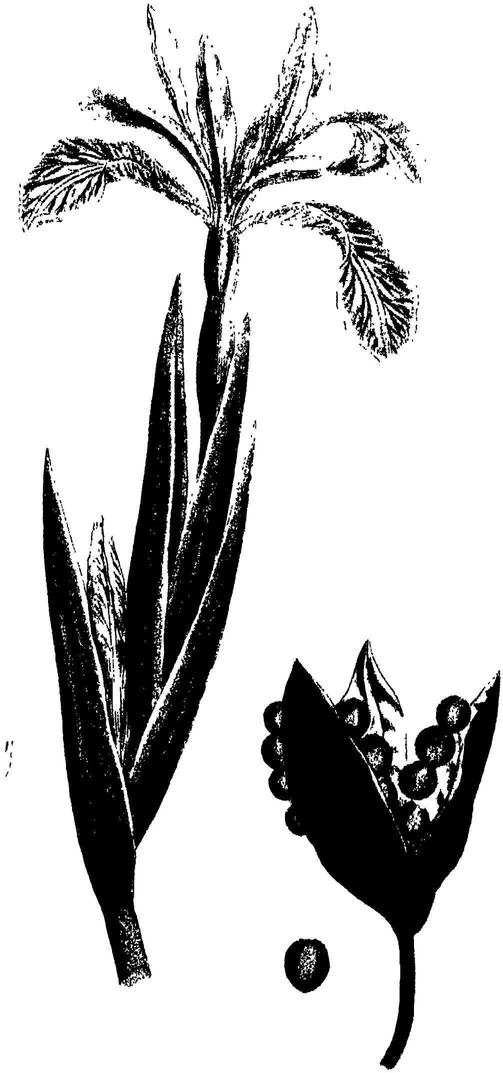
. Bermudiana. Blue Sisyrinchium.



Trichonema Columnæ. Columna's Trichonema.

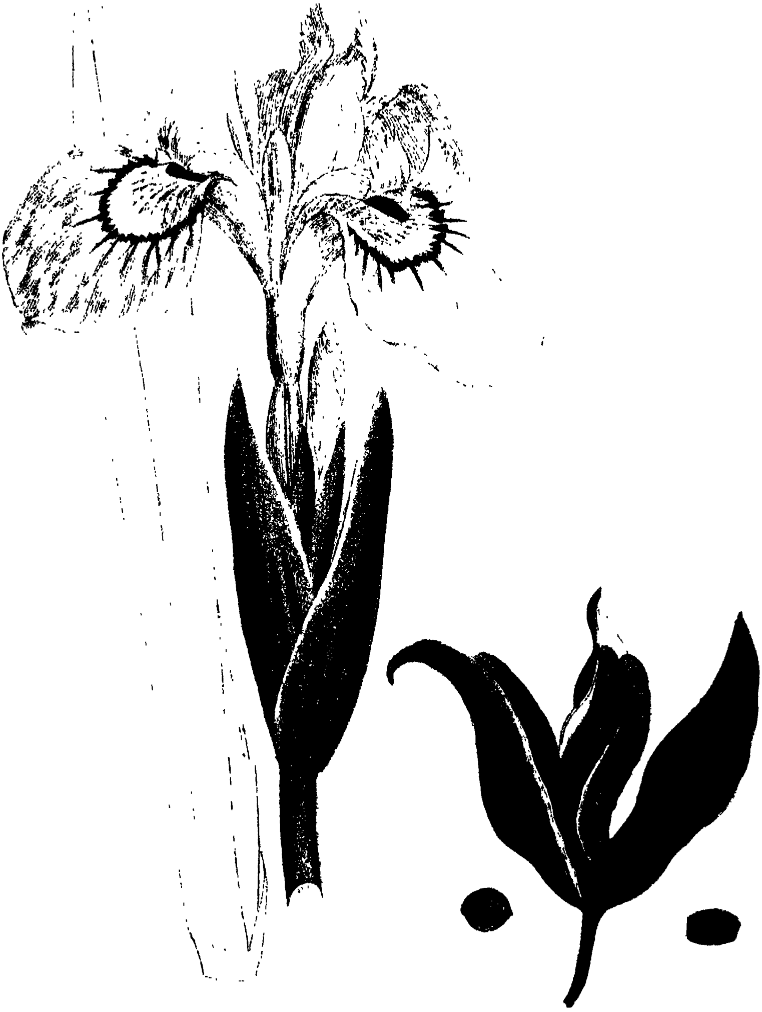


Gladiolus Illyricus Lesser G

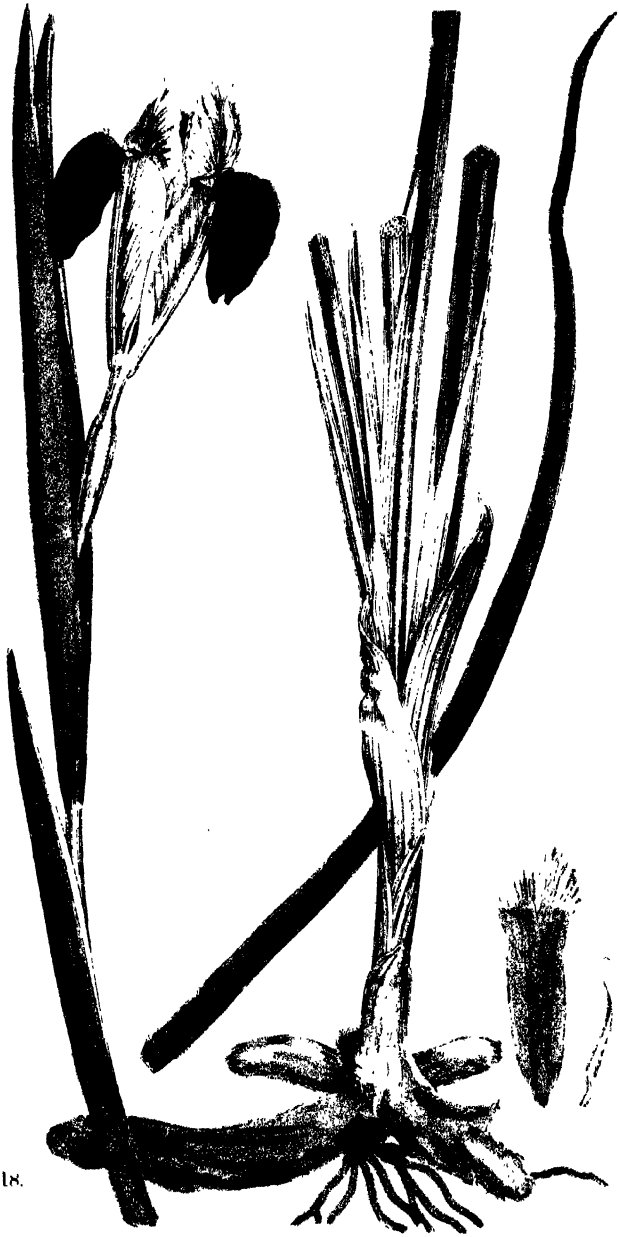


B. 596.

Iris fœtidissima.   Fœtid Iris.

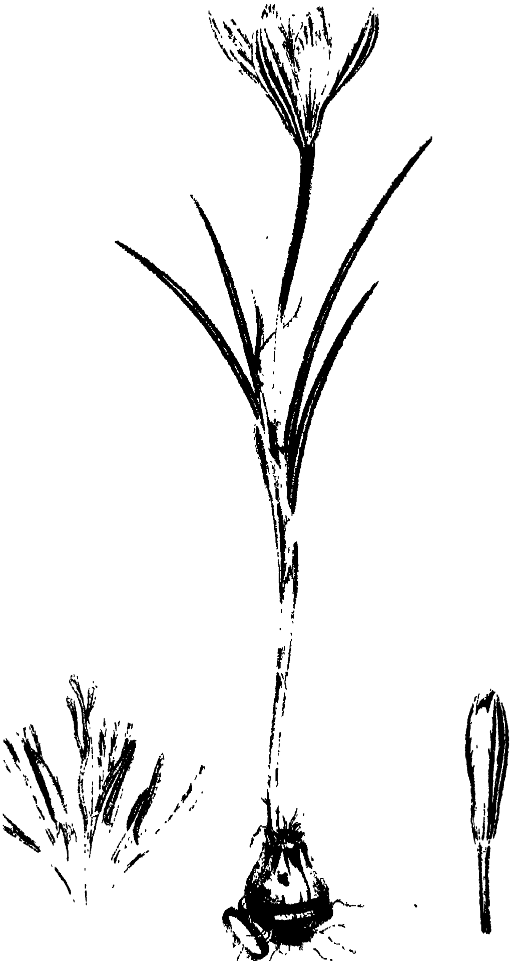


ris Pseud-acorus. Yellow Water Iris



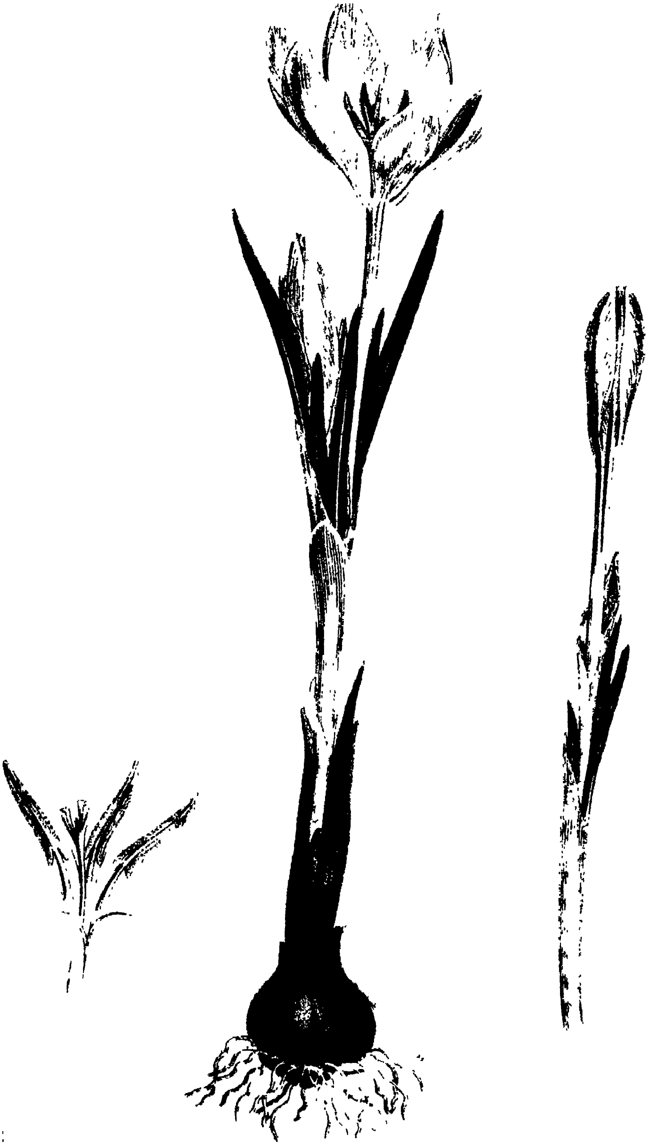
E. B. S. 2818.

Iris tuberosa.   Tuberous Iris.



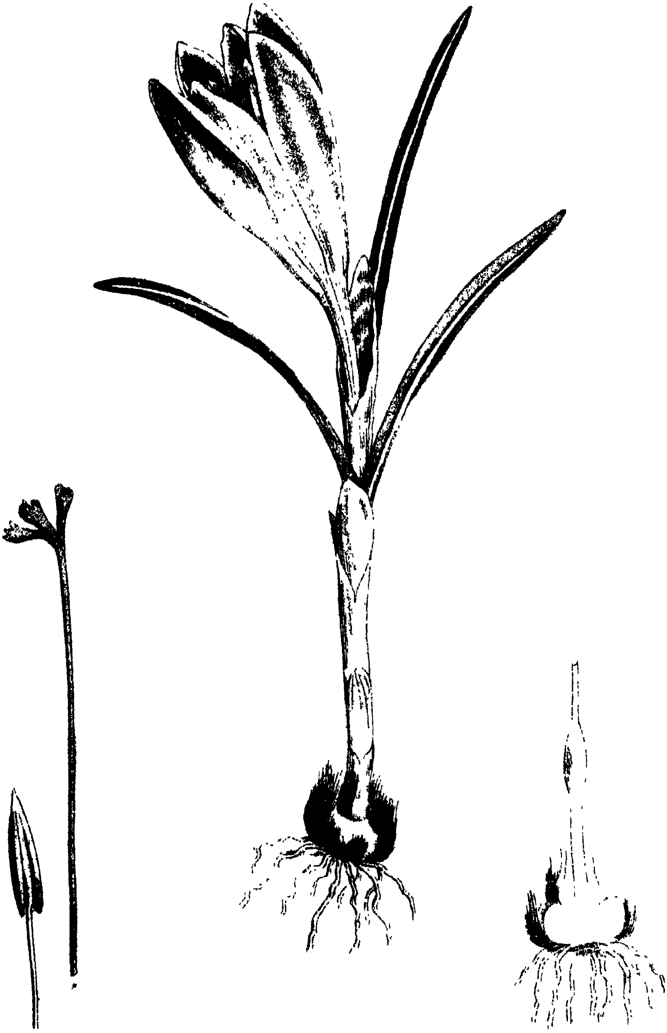
E. B. S. 2645.

Crocus biflorus. Scotch Crocus.



Crocus luteus. Golden Crocus

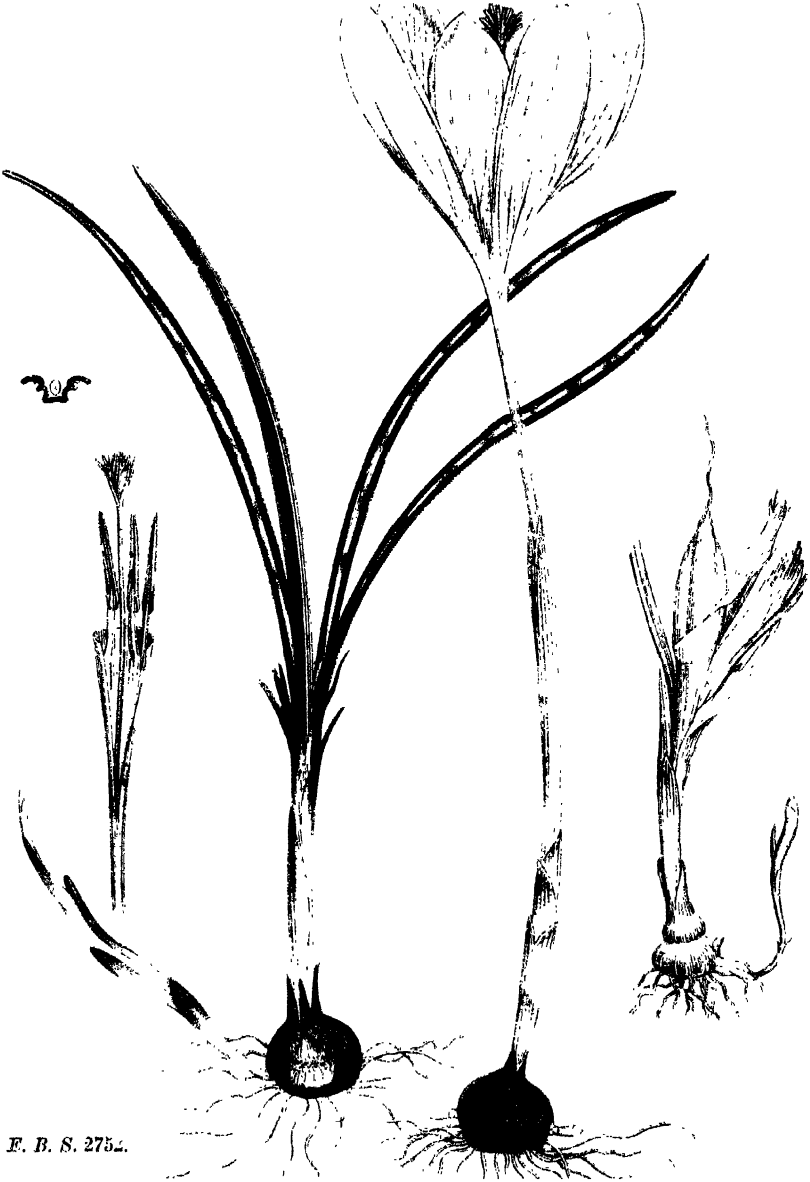
MCCCCXCIX.



E. B. 344.

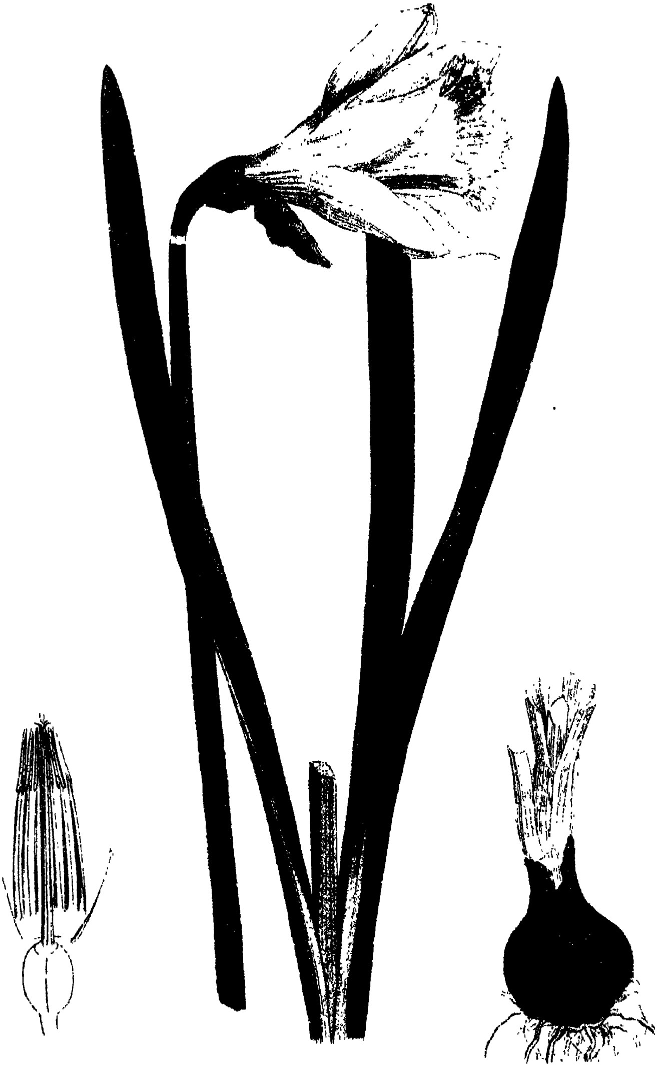
Crocus vernus. Purple Crocus.

MD.



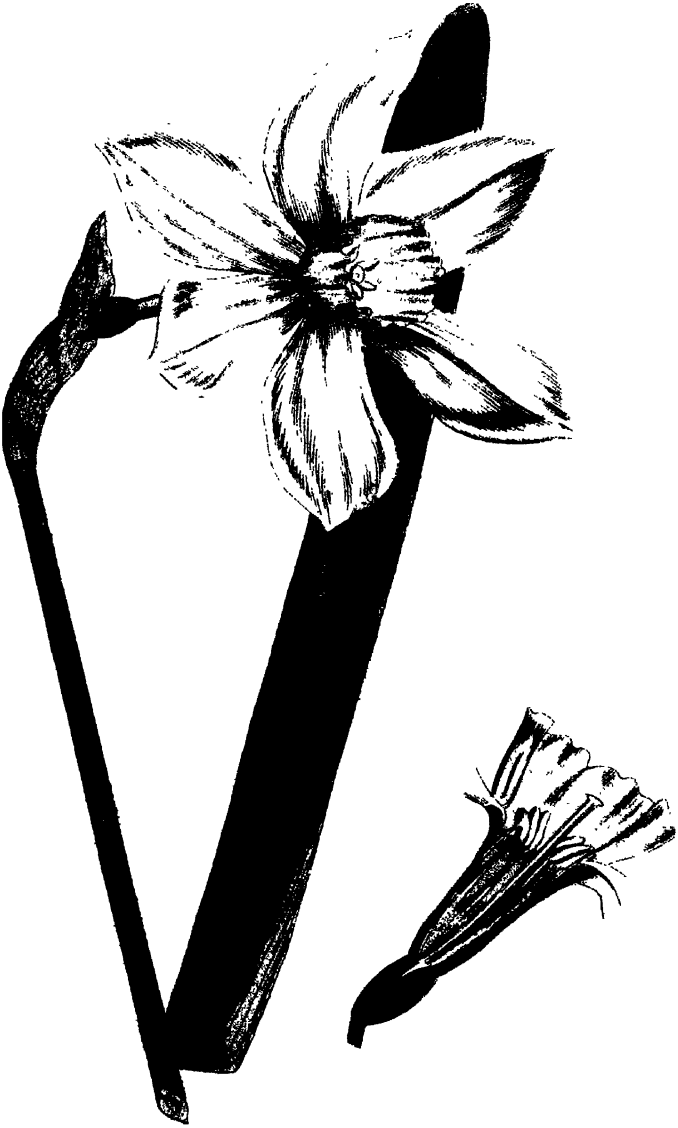
E. B. S. 2752.

Crocus nudiflorus. Naked-flowering Crocus.

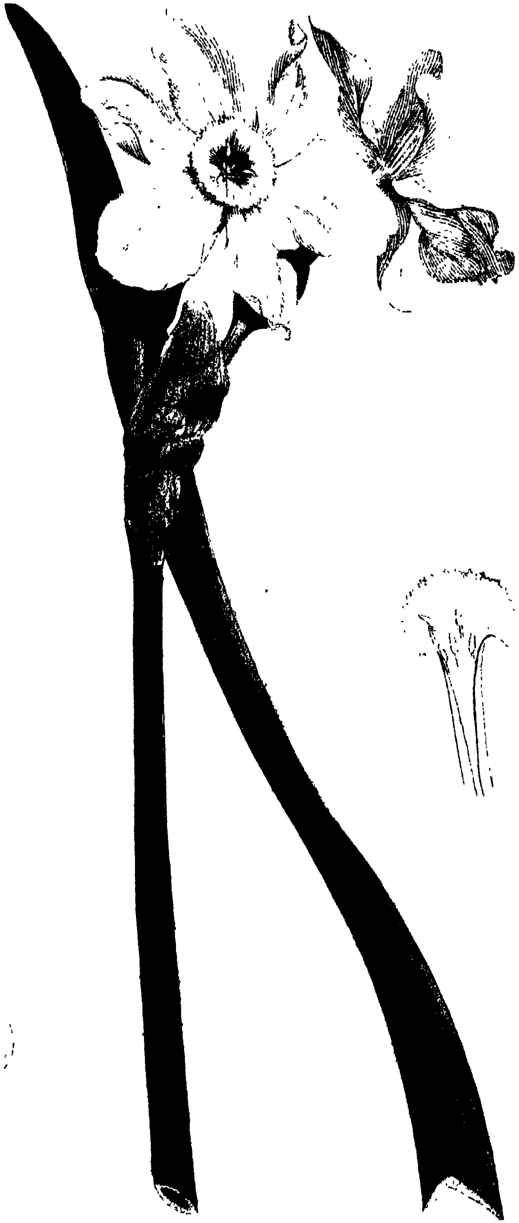


E B. 17.

Narcissus Pseudo-narcissus. Common Daffodil.



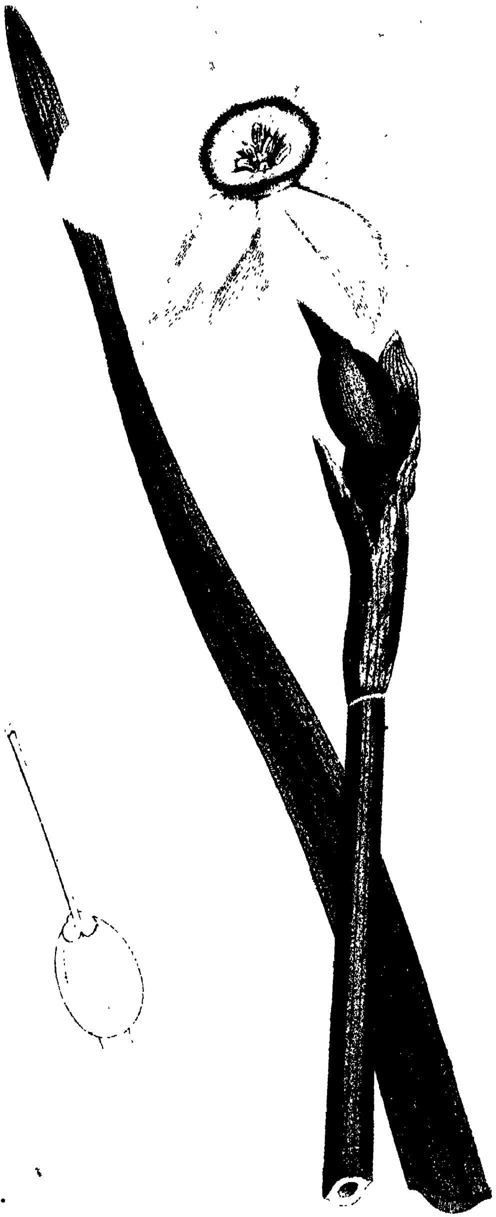
Narcissus incomparabilis. Short-crowned Daffodil.



E. B. 276.

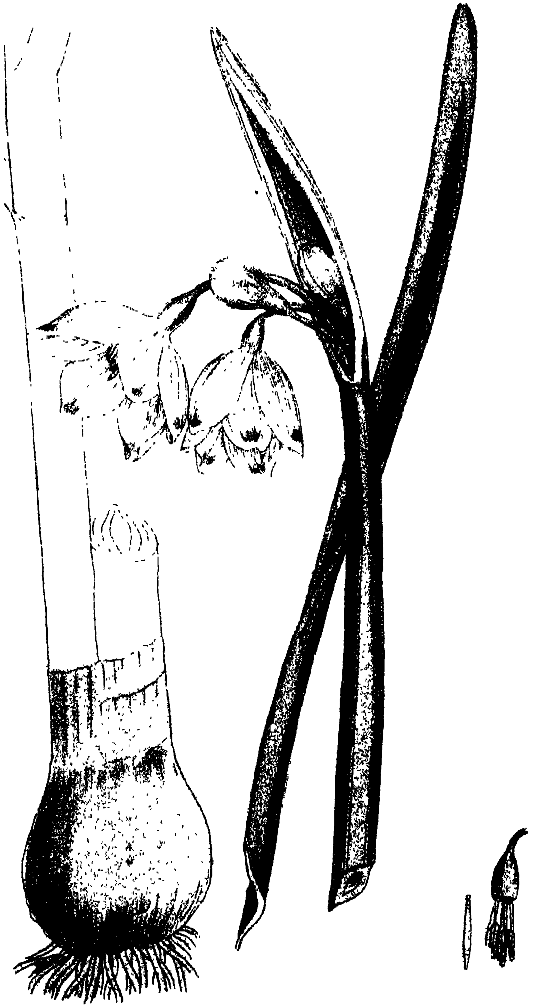
Narcissus biflorus. Two-flowered Narcissus.

MDIV.



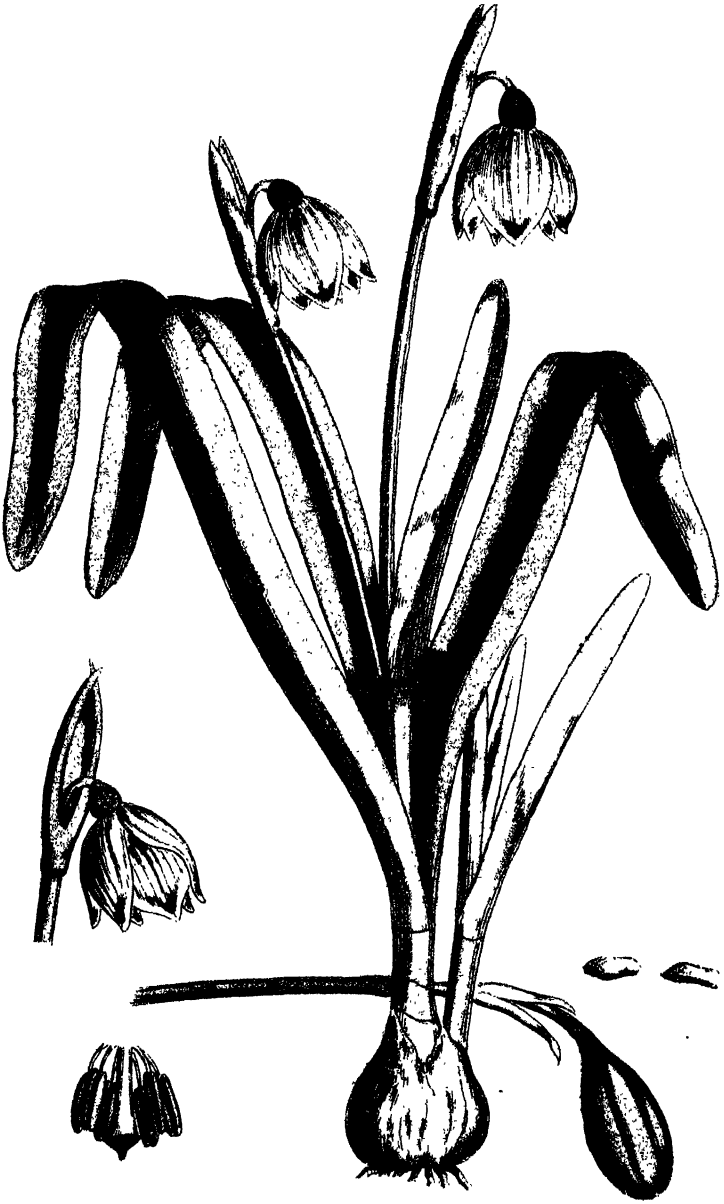
E. B. 275.

Narcissus

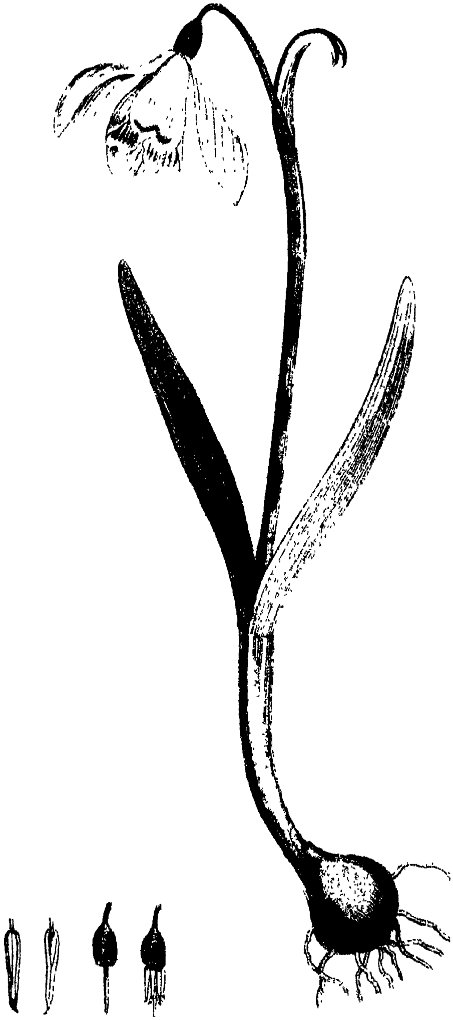


E. B. 621

Leucoium æstivum. Summer Snowflake.

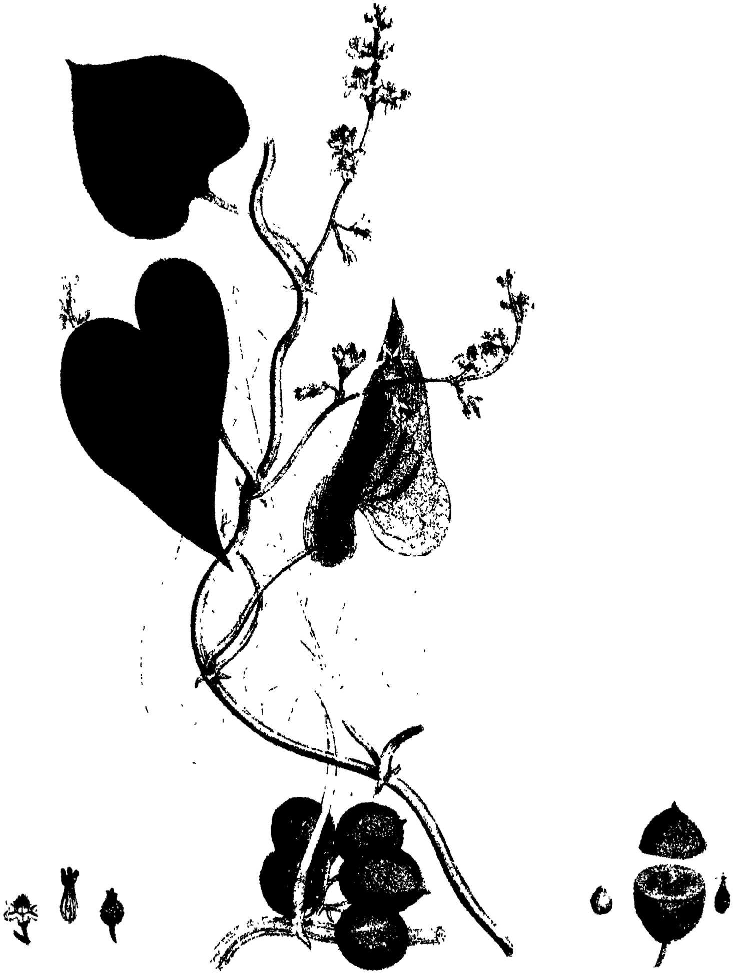


Leucoium vernum. Spring Snowflake.



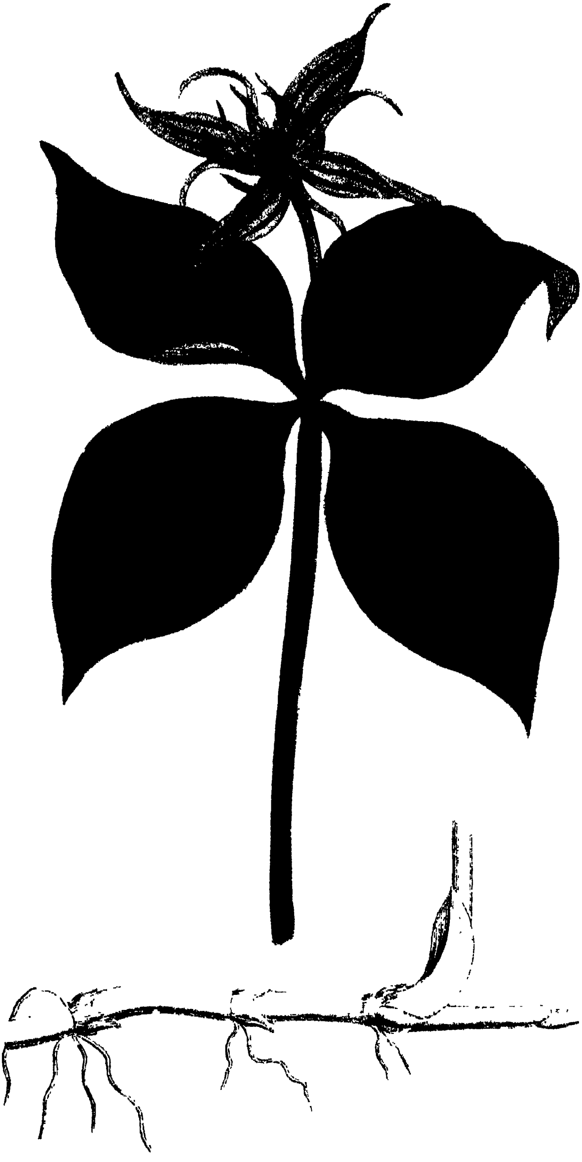
E. B. 19.

Galanthus nivalis. Common Snowdrop.



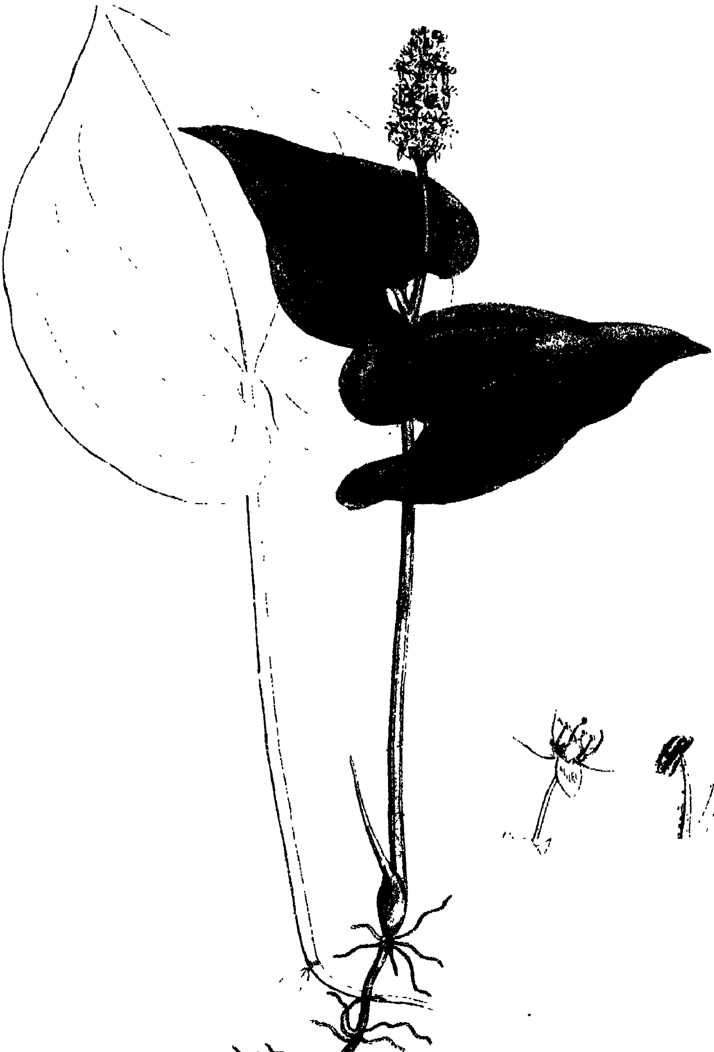
E. B. 91.

Tamus communis. Black Bryony.

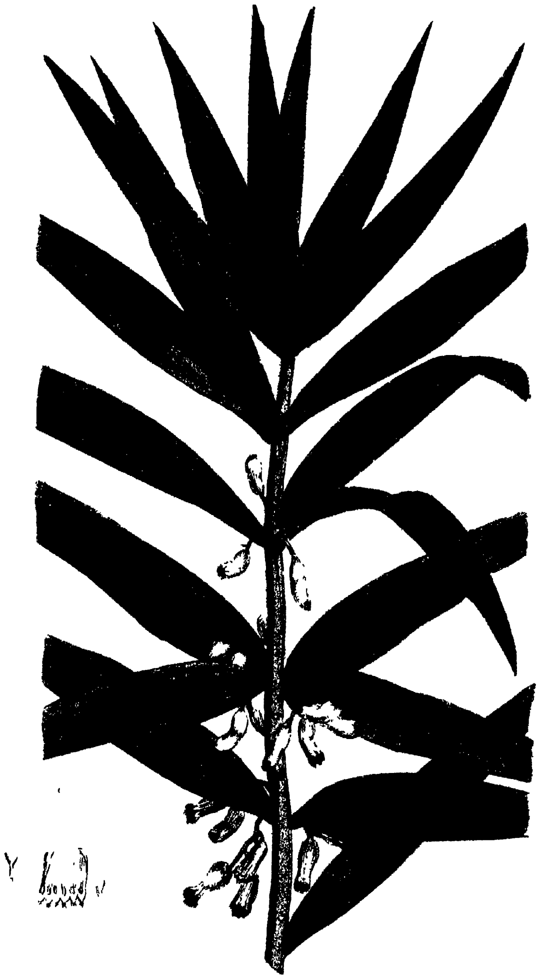


E. B. 7.

Paris quadrifolia. Herb-Paris.

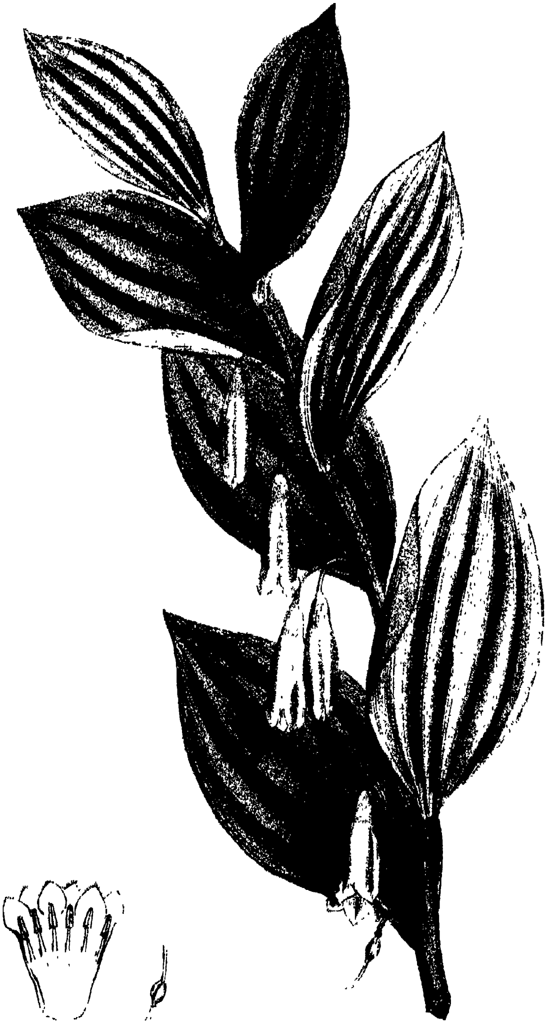


Smilacina bifolia. **Two-leaved Smilacina.**



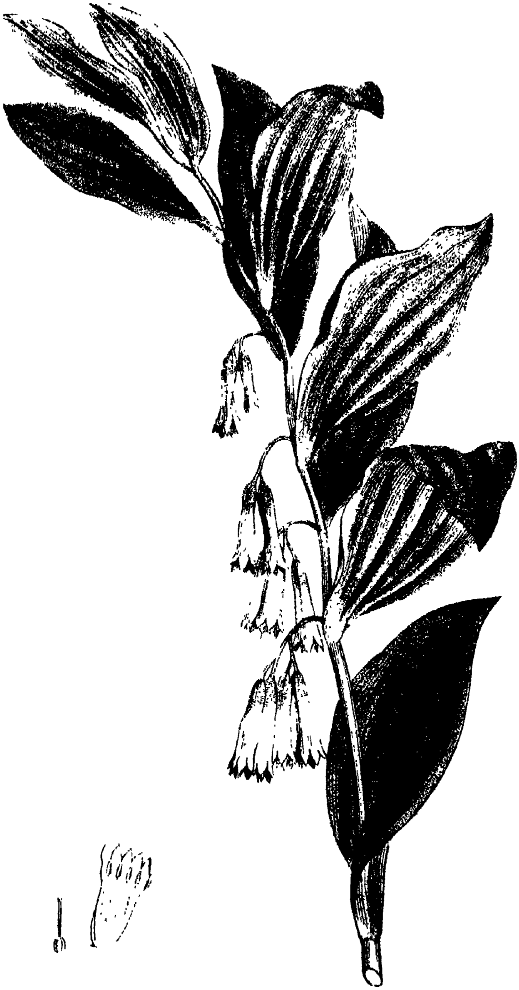
E. B. 128.

Polygonatum verticillatum. Whorled-leaved Solomon's Seal.



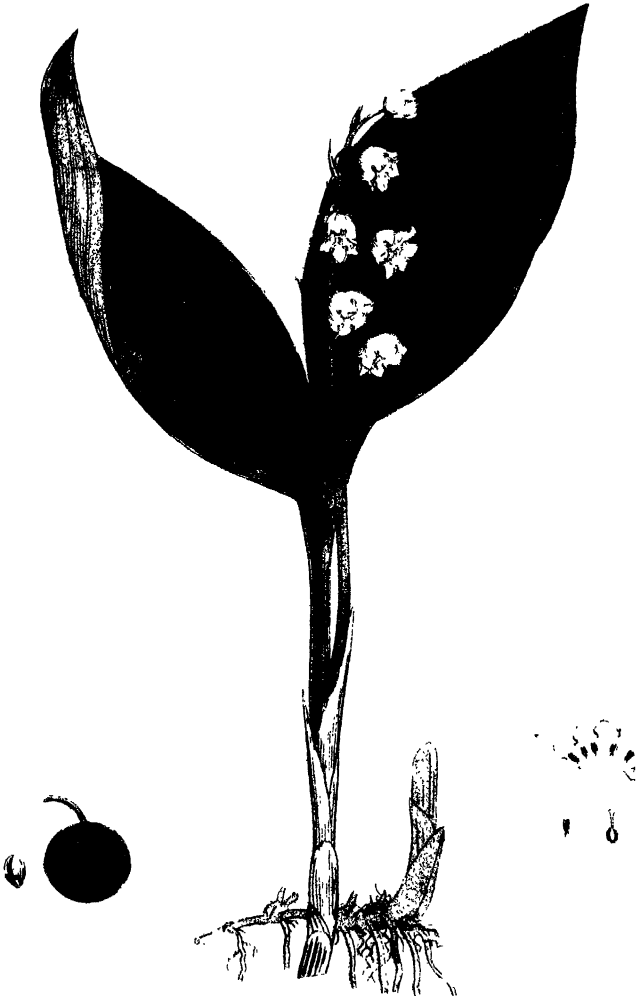
E. B. 280.

Polygonatum officinale. Angular-stemmed Solomon's Seal.



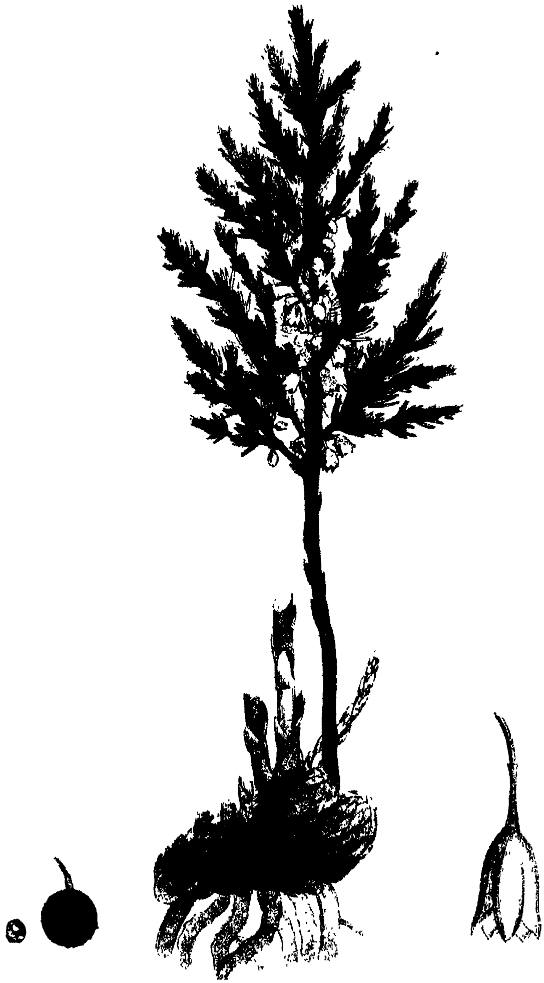
E. B. 279.

Polygonatum multiflorum. Common Solomon's Seal.



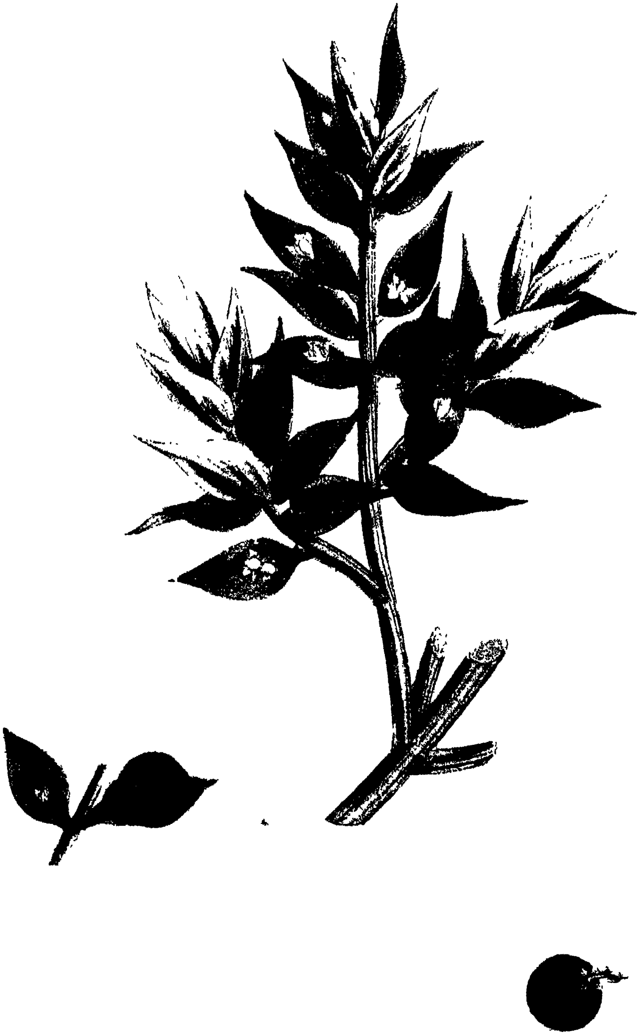
. *B.* 1035.

Convallaria maialis. **Lily-of-the-Valley.**



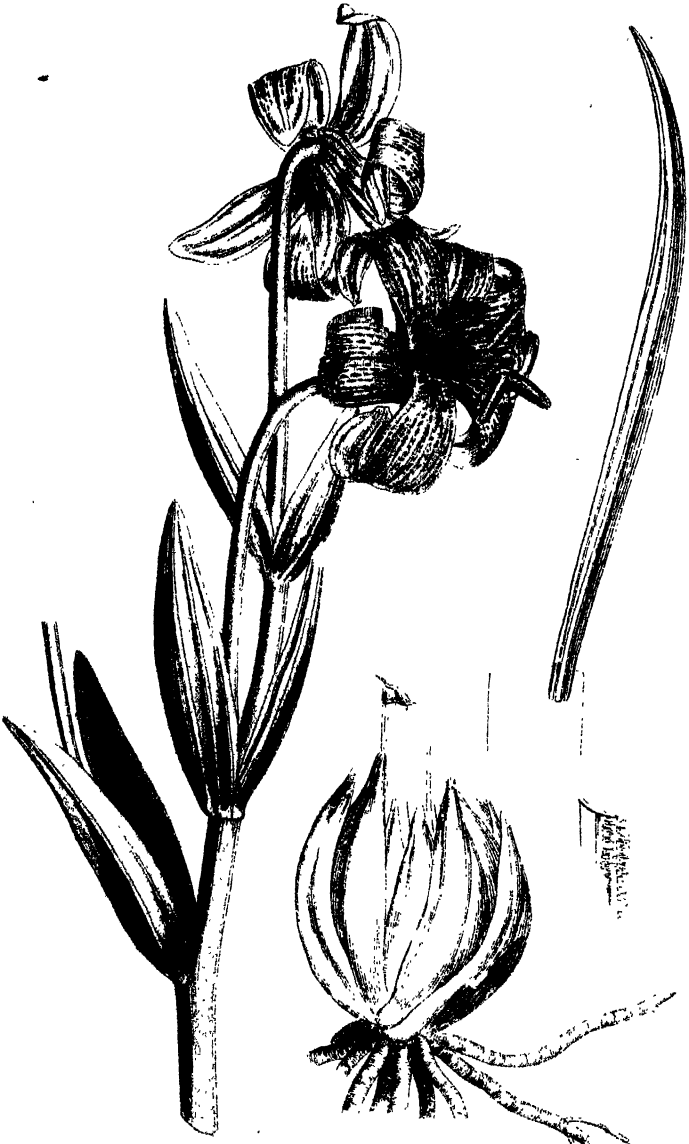
B. 339.

Asparagus officinalis. Asparagus.

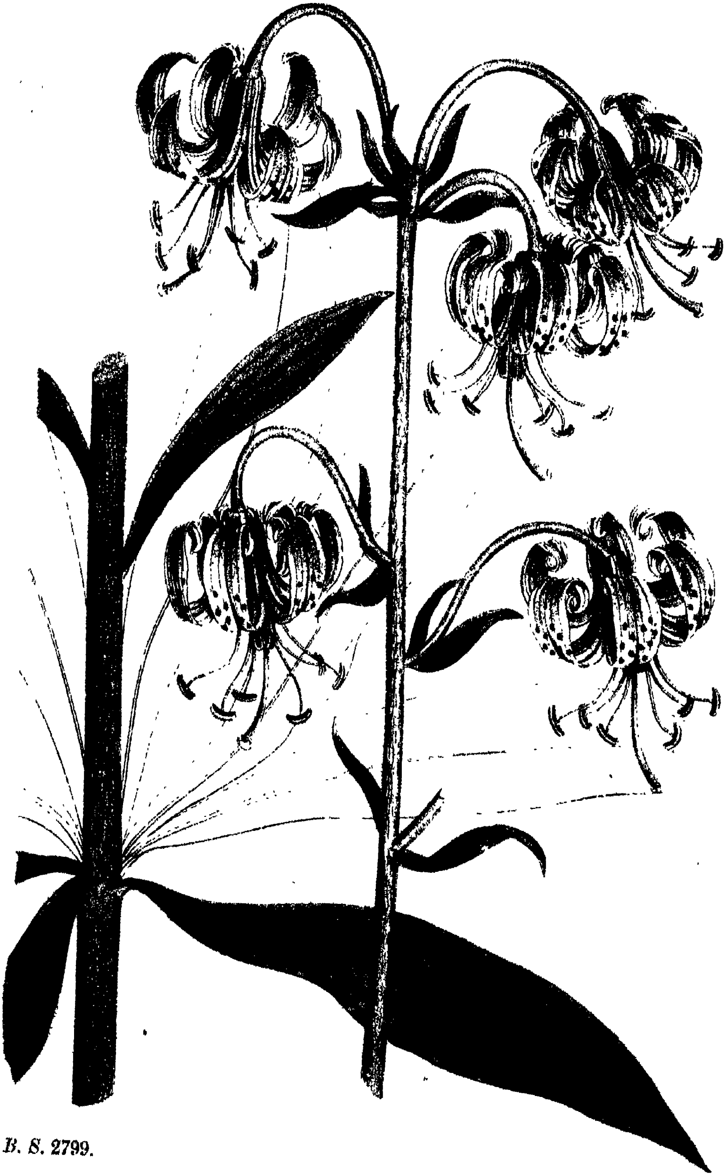


E. B. 560.

Ruscus aculeatus. Common Butcher's-Broom.

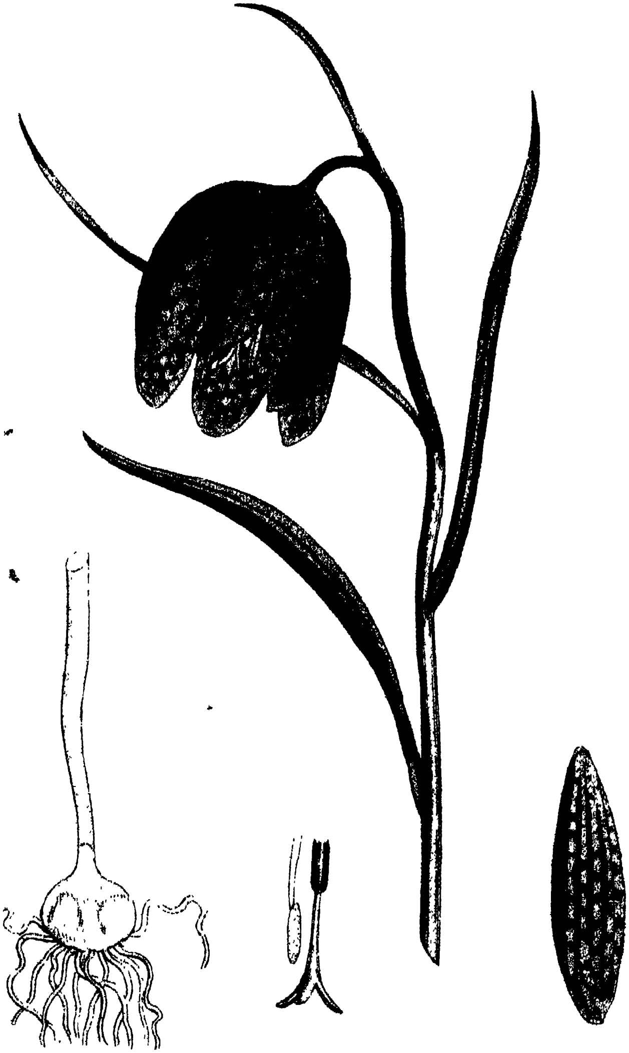


ilium Pyrenaicum. Yellow Martagon Lily.



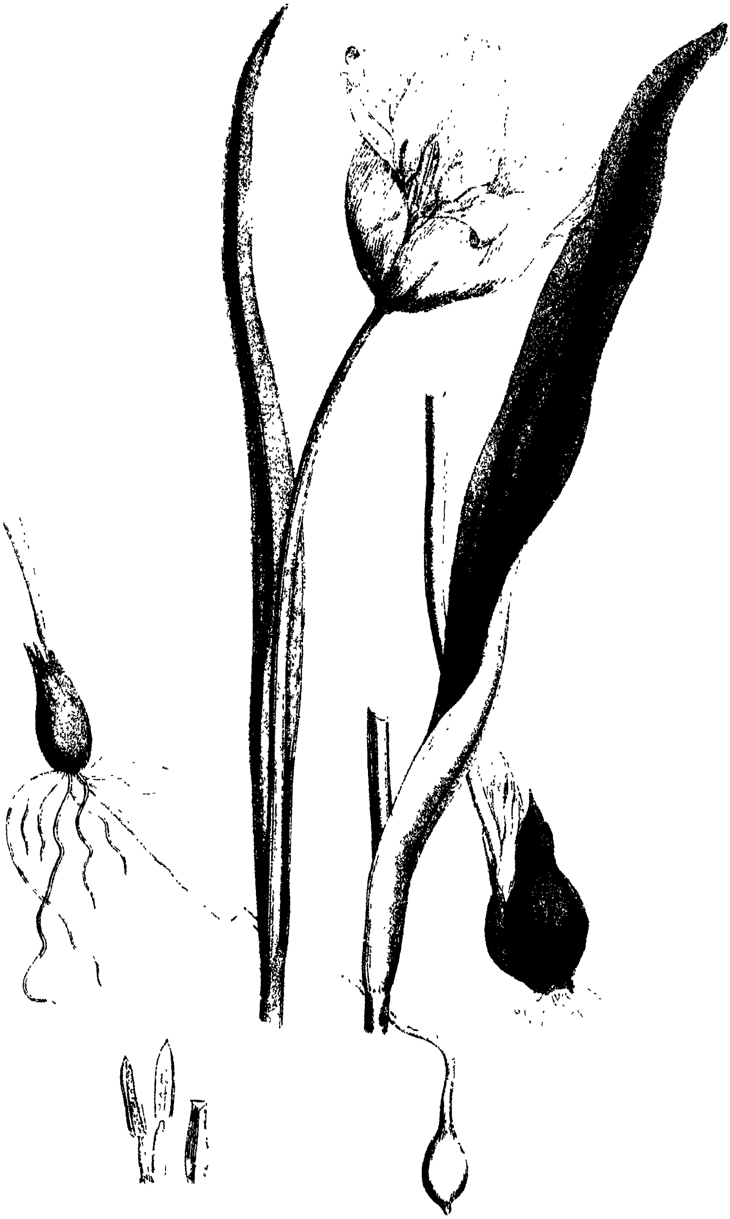
E. B. S. 2799.

Lilium Martagon. Purple Martagon Lily.



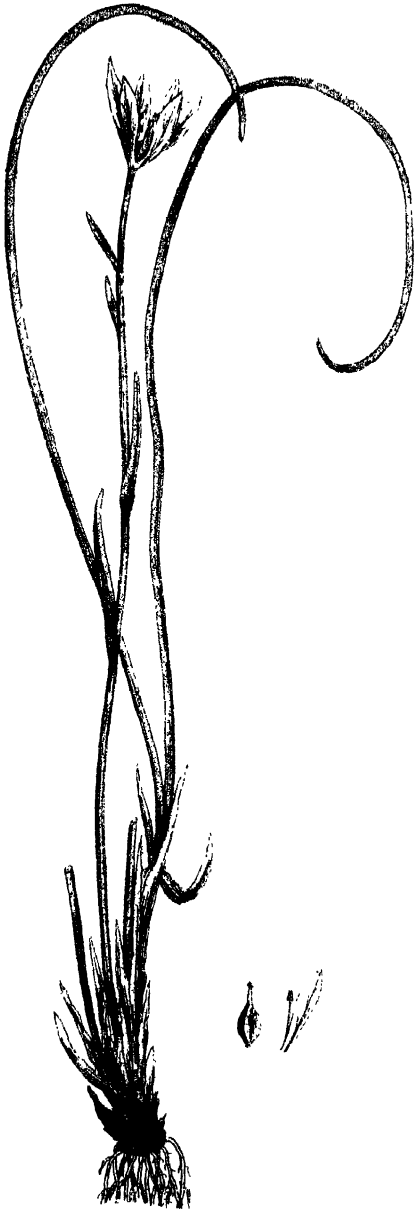
E. B. 622.

Fritillaria Meleagris. **Common Fritillary.**



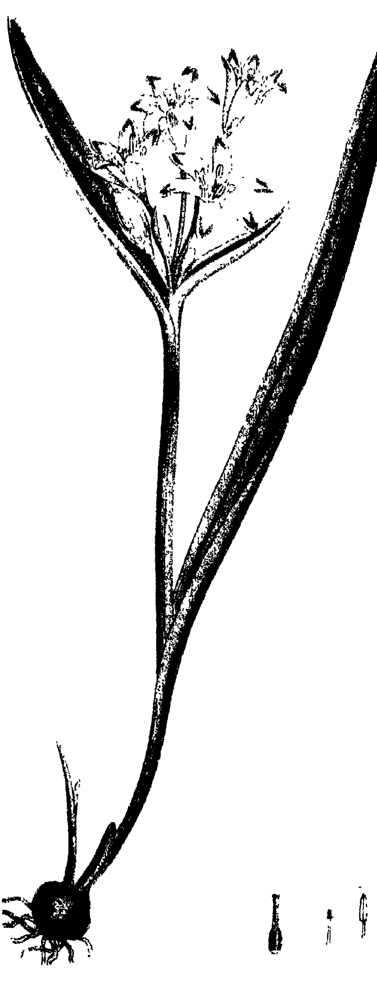
E. B. 63.

Tulipa sylvestris. **Wild Tulip.**



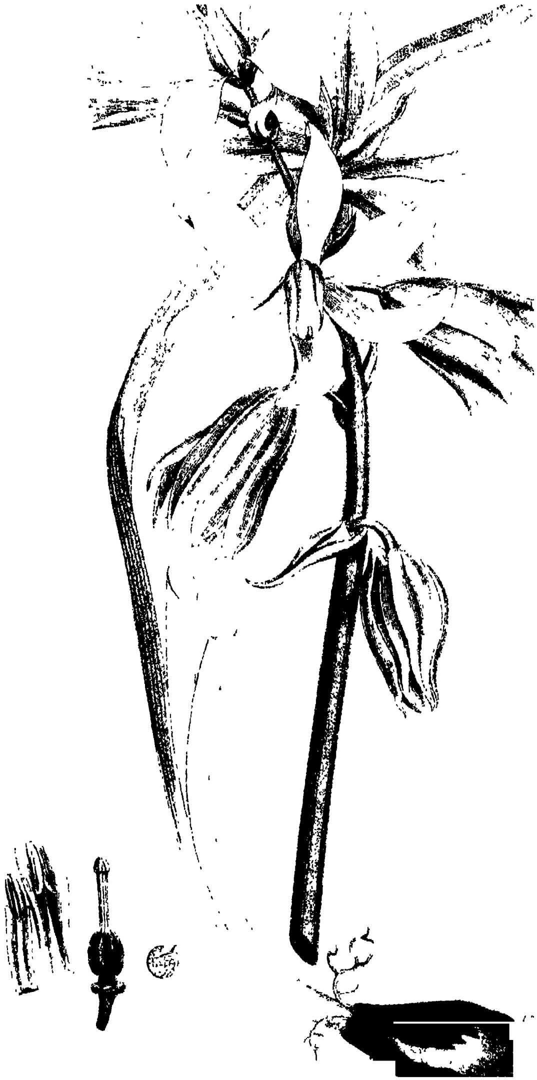
E. B. 793.

Lloydia serotina. Mountain Lloydia



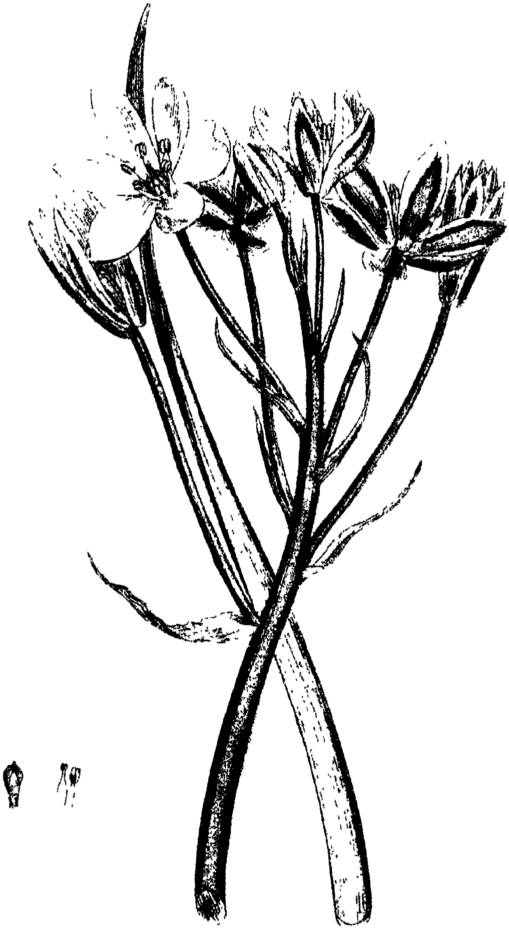
E. B. 21.

Gagea lutea. Yellow Star-of-Bethel.



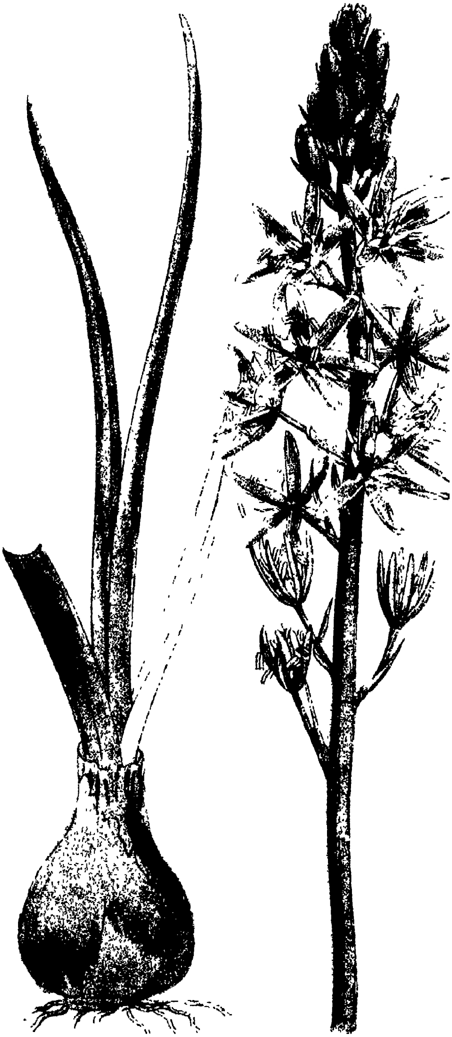
E. B. 1997.

Ornithogalum nutans.   Drooping Star-of-Bethel.

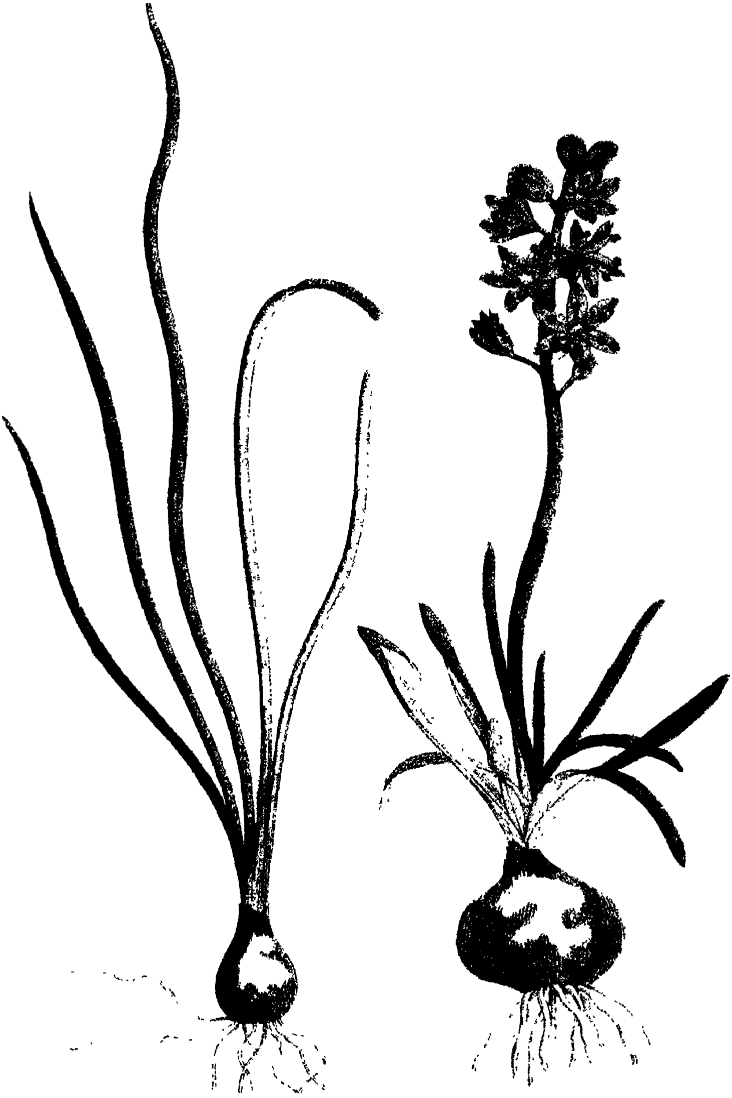


E. B. 130.

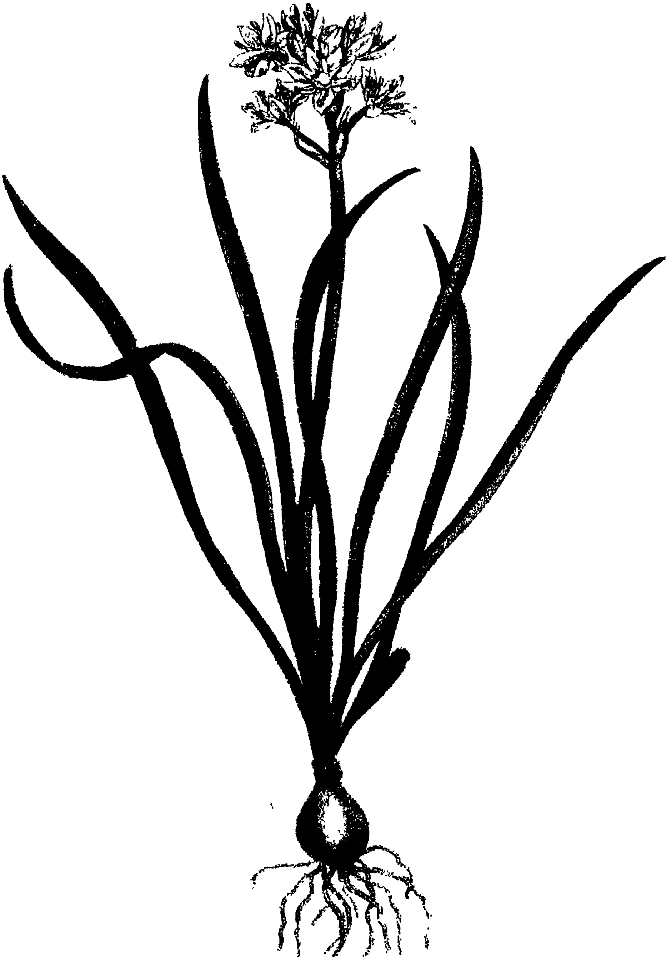
Ornithogalum umbellatum. Common Star-of Bethel.



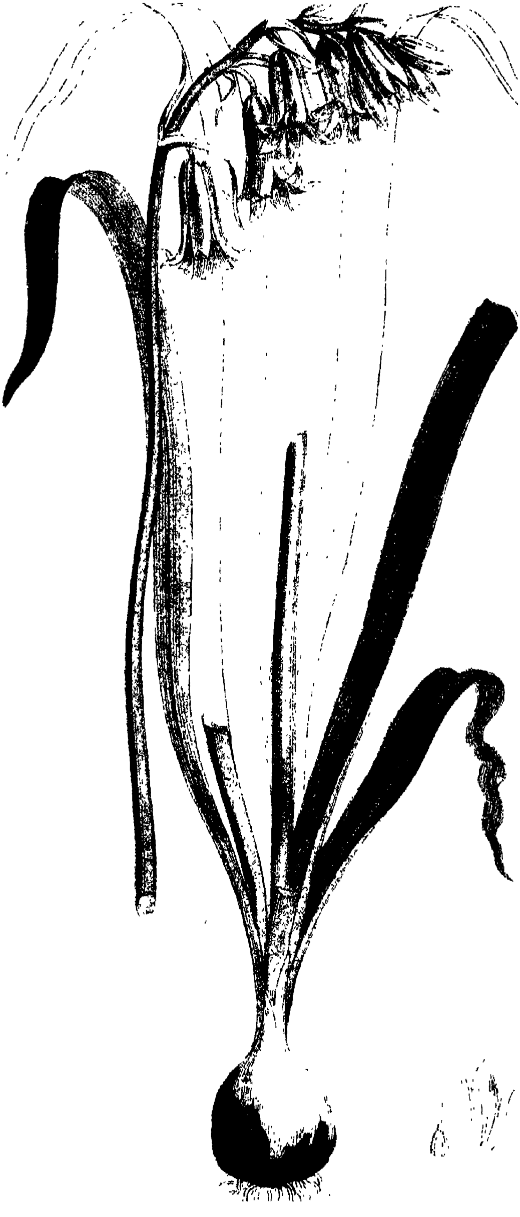
Ornithogalum Pyrenaicum. Spiked Star-of-Bethel.



Scilla autumnalis. Autumnal Sq

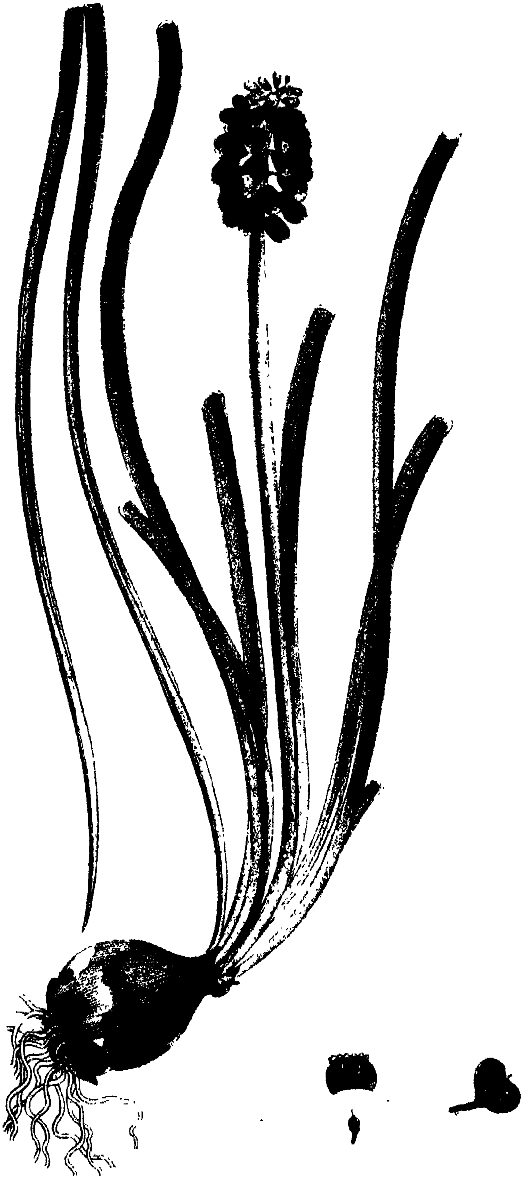


Scilla verna. Vernal Squill.



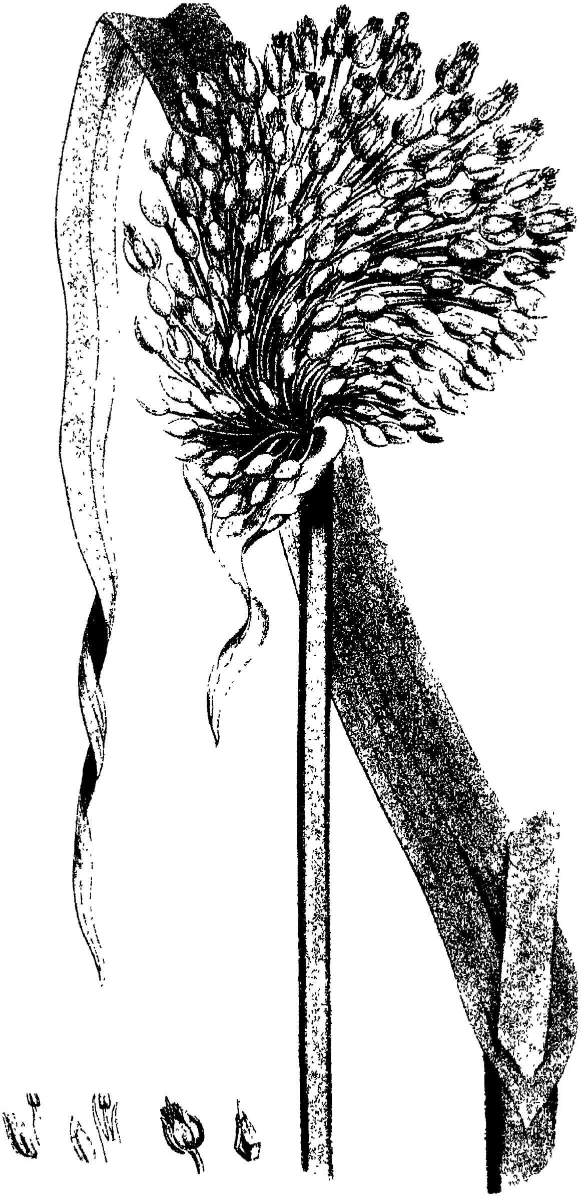
E. B. 377.

Scilla nutans. Wood Hyacinth.



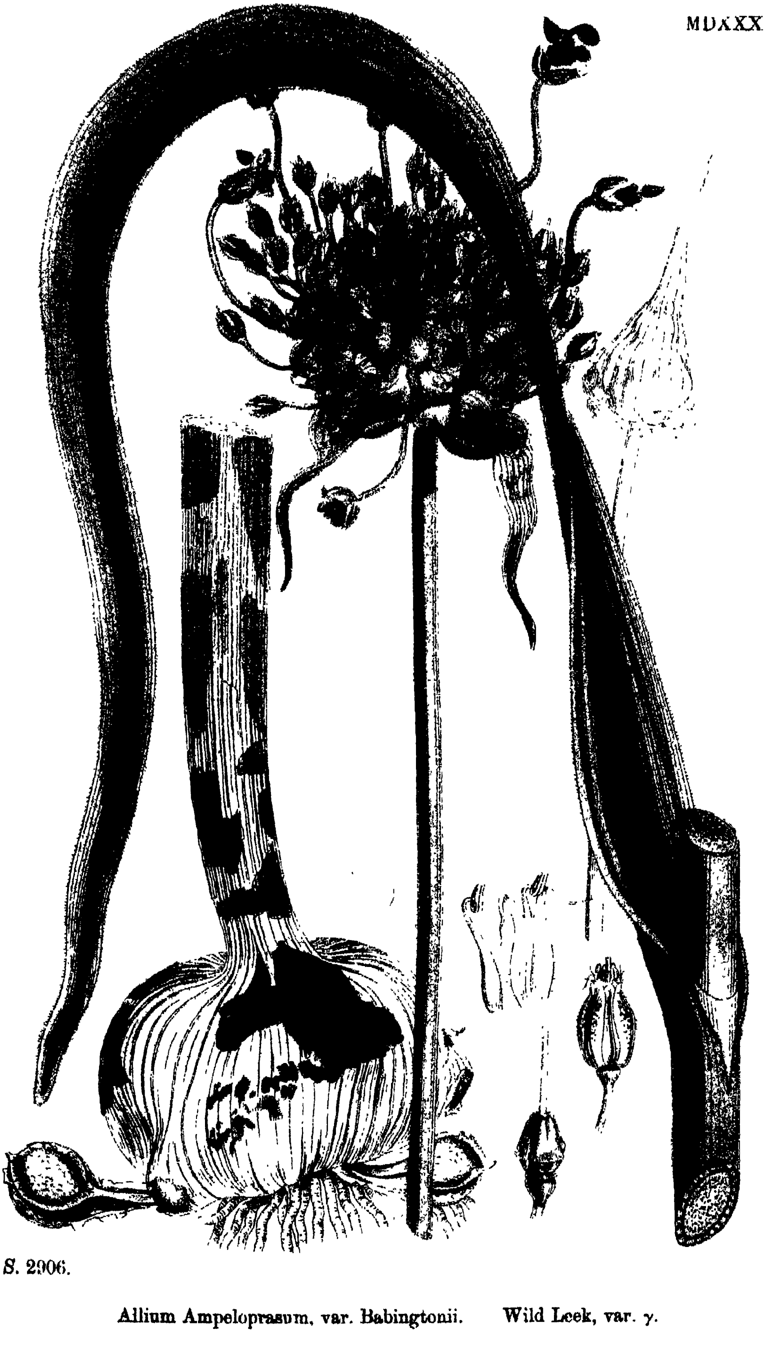
E. B. 1931.

Muscari racemosum.   Starch Hyacinth.



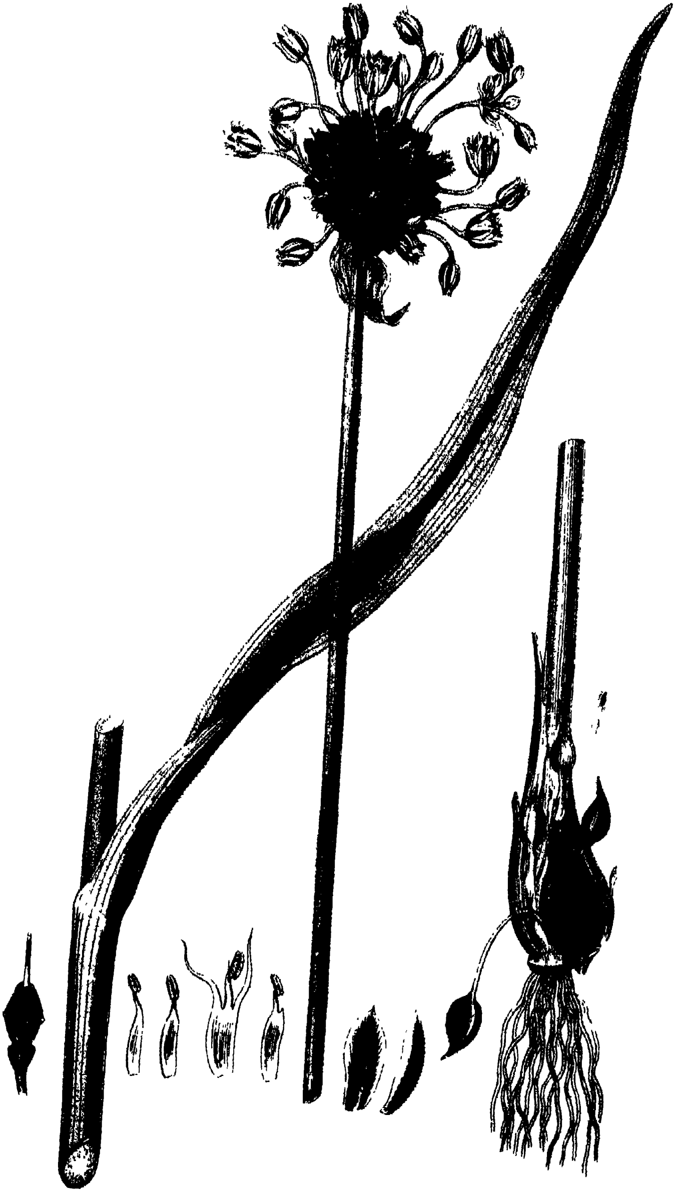
E. B. 1657.

Allium Ampeloprasum, var. genuinum. Wild Leek, var. *α*.



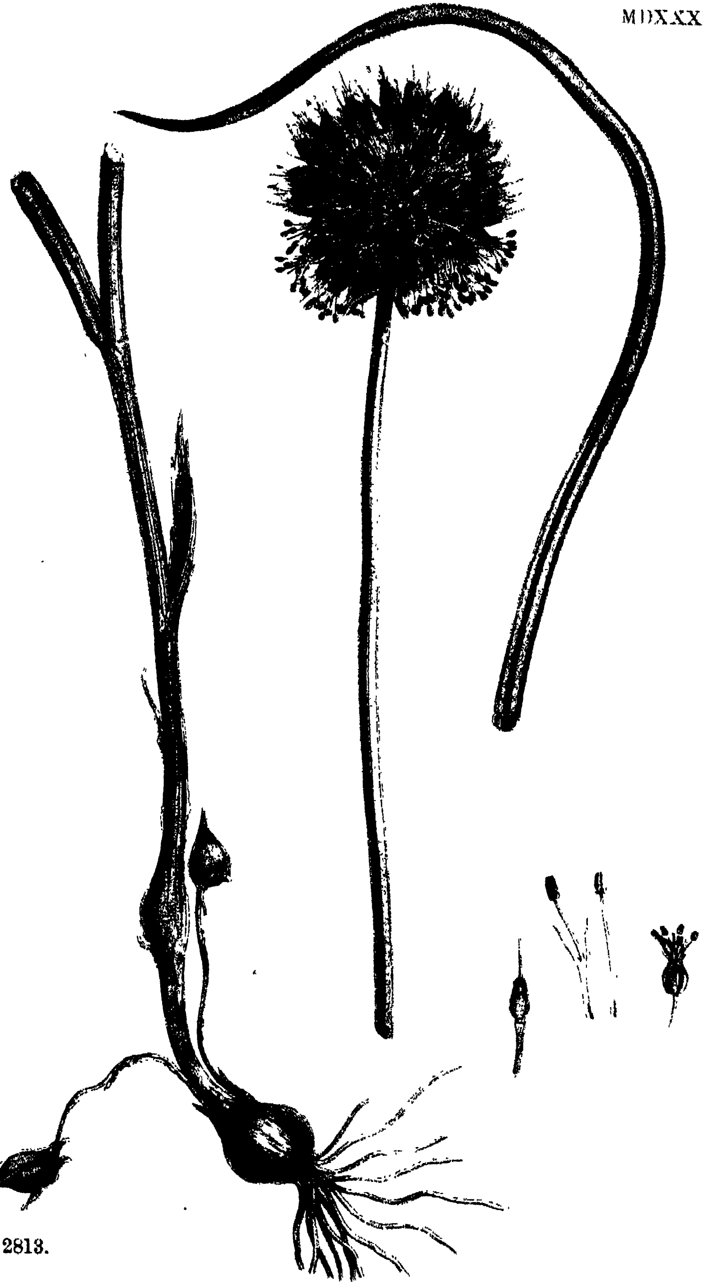
E. B. S. 2906.

Allium Ampeloprasum, var. Babingtonii. Wild Leek, var. γ.



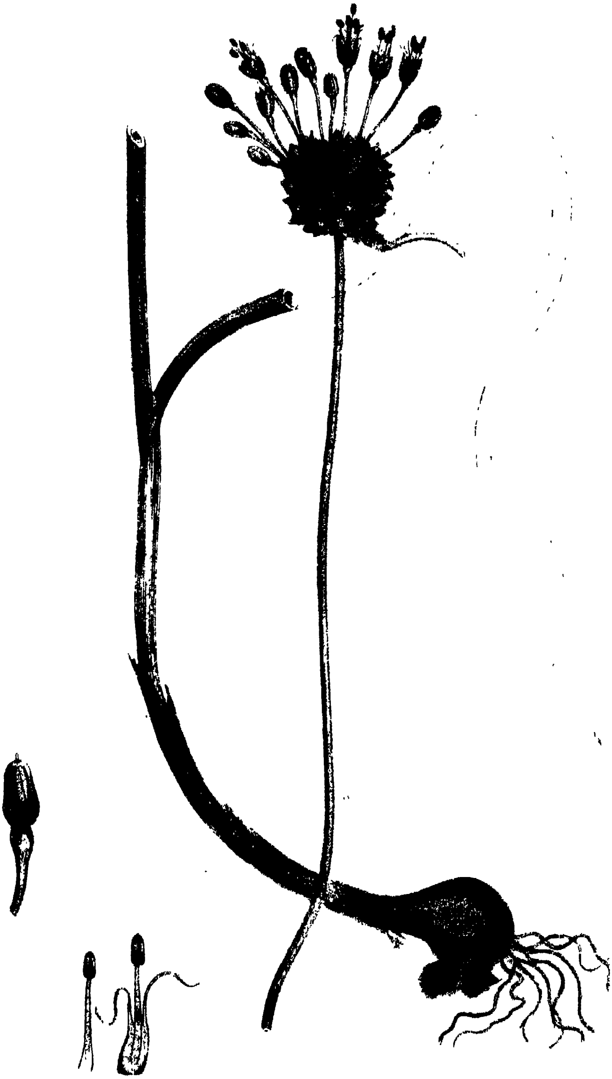
E. B. S. 2905.

Allium Scordoprasum. Sand Leek.



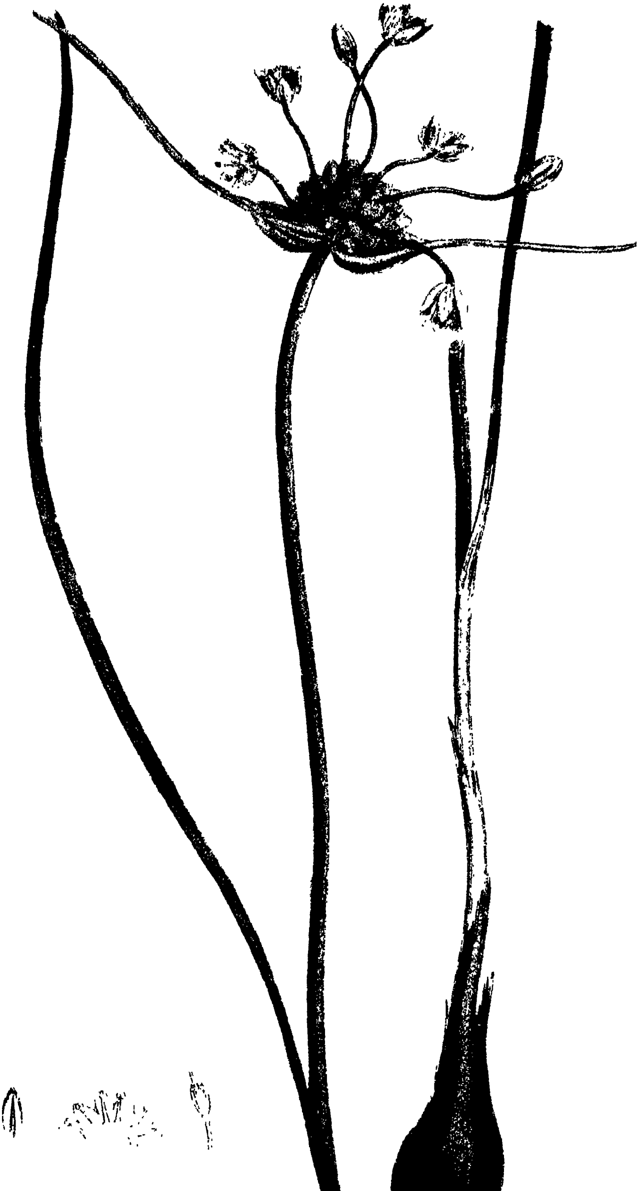
E. B. S. 2813.

Allium sphærocephalum. **Round-headed Garlic**

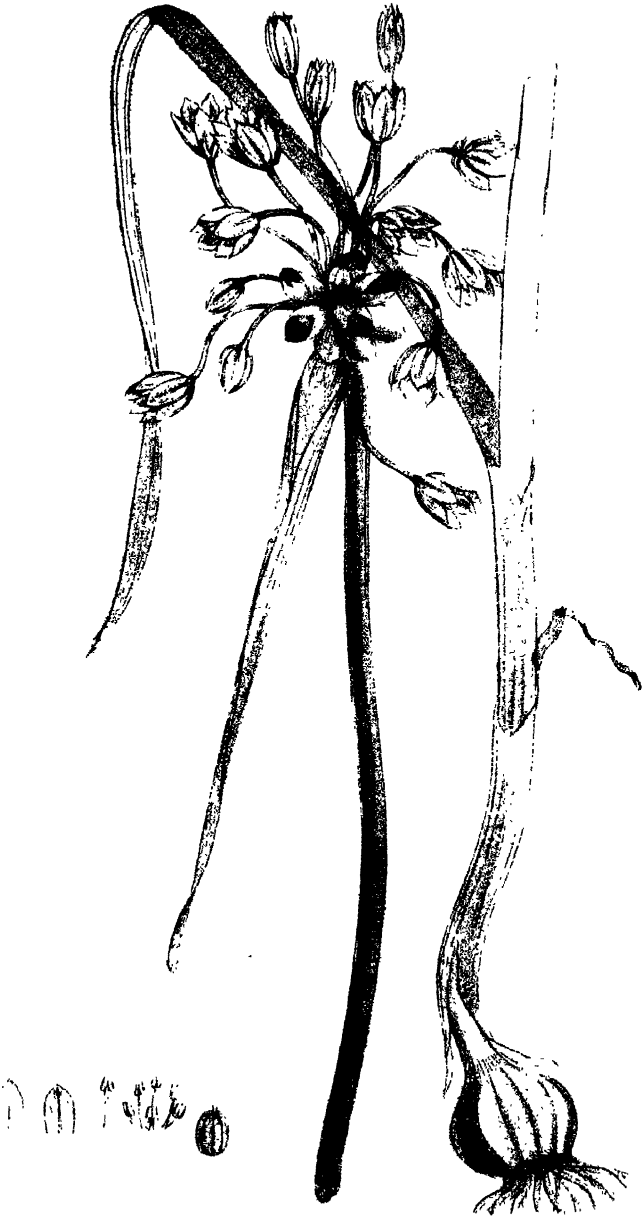


E. B. 1974.

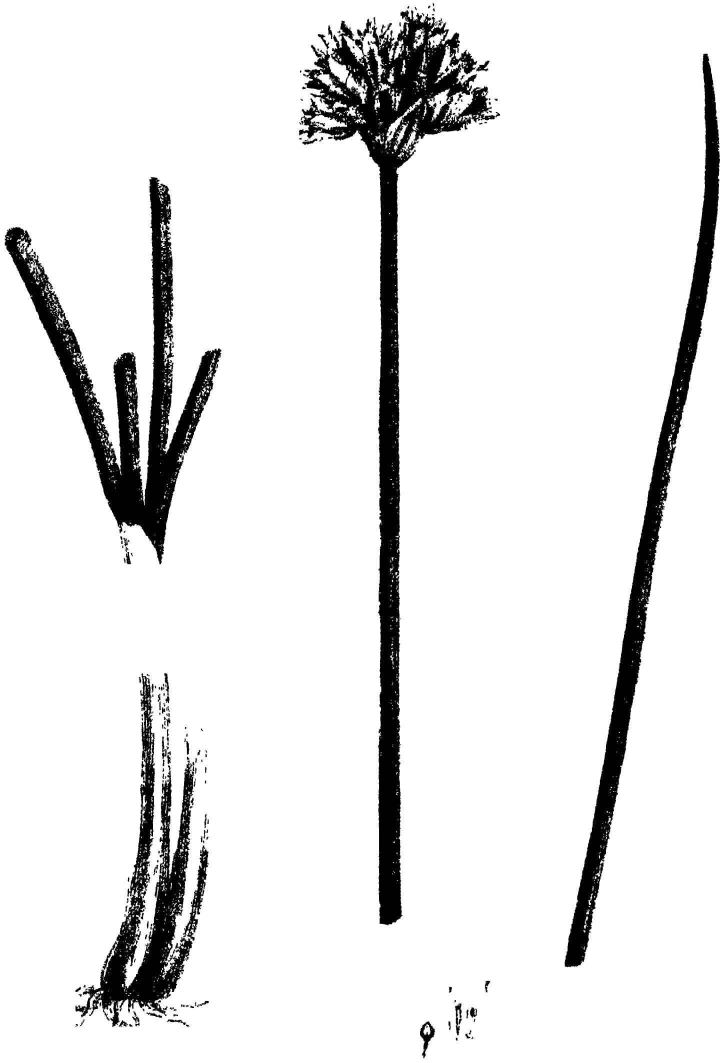
Allium vineale. Crow Garlic.



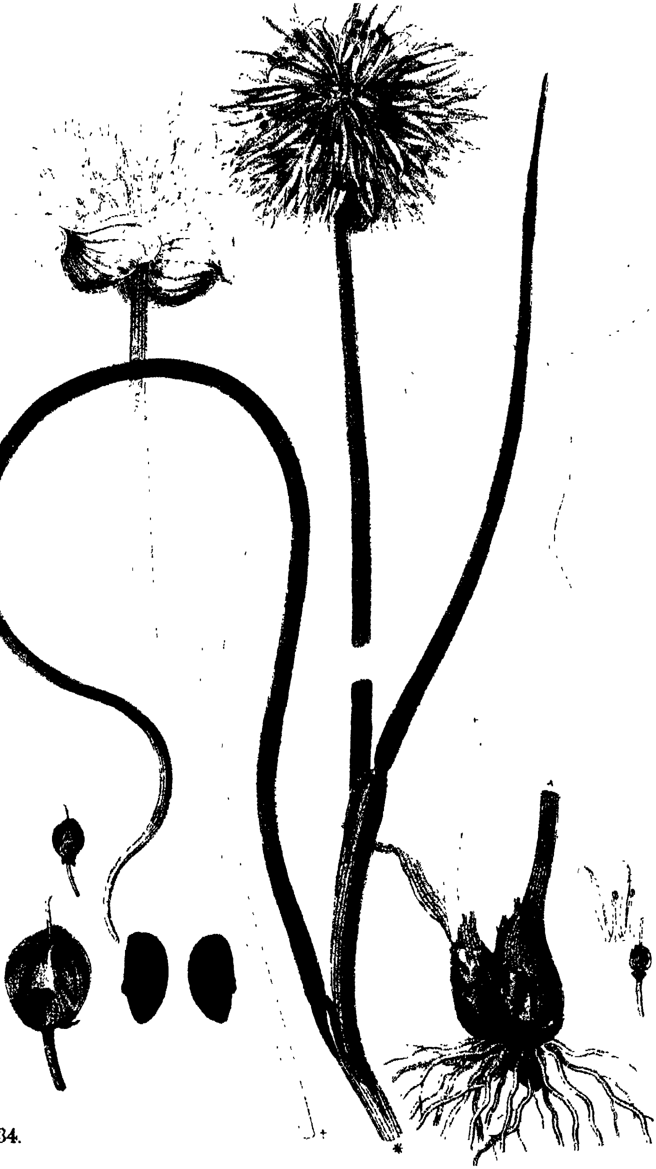
Allium oleraceum, var. genuinum. Field Garlic, var



Allium oleraceum, var. complanatum. Field Garlic, var. β.

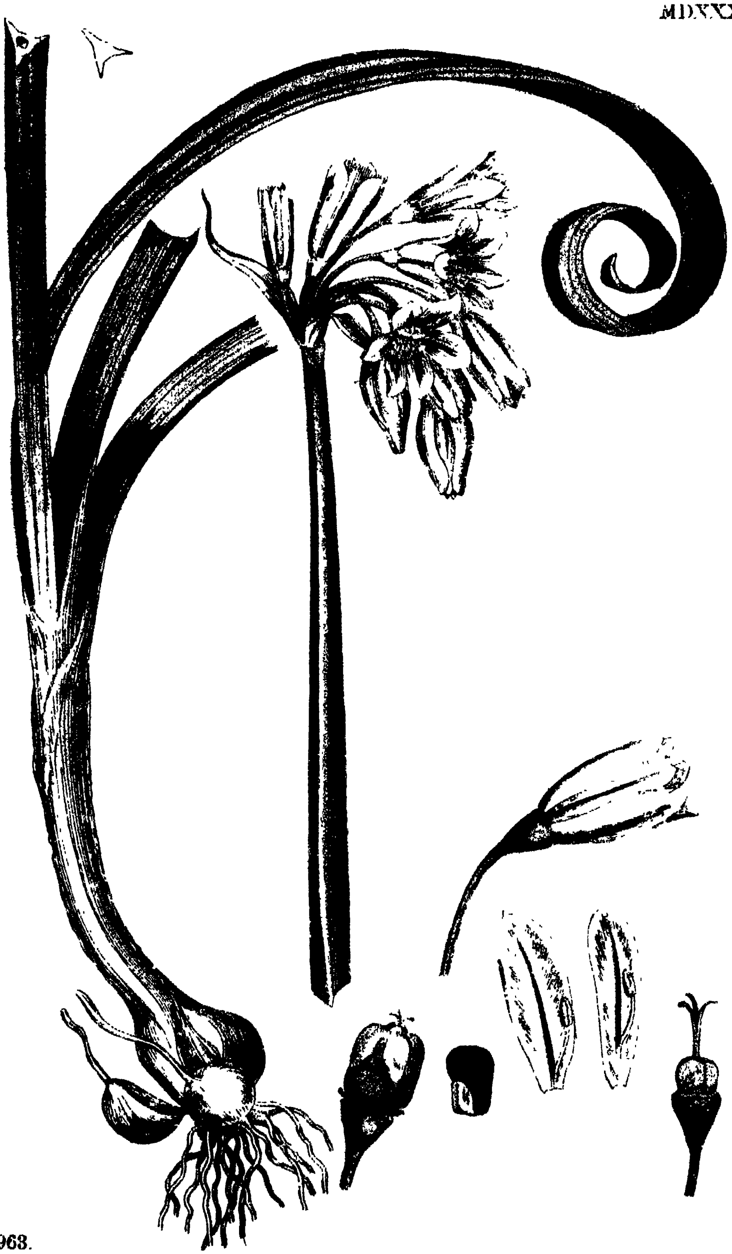


Allium eu-Schœnoprasum. Garden Chives



E. B. 2934.

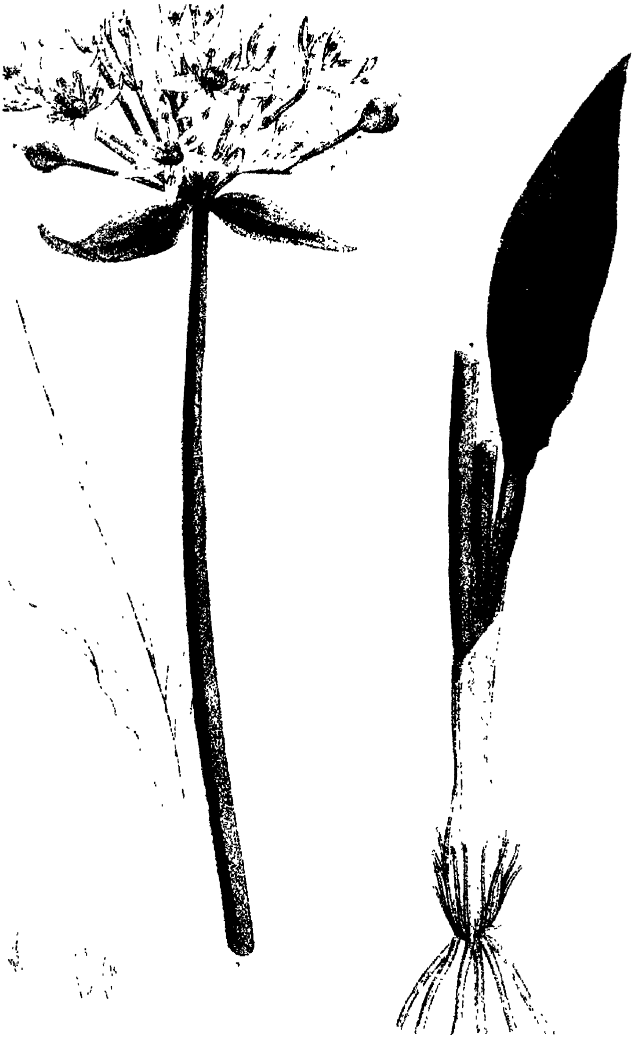
Allium Sibiricum. Greater Ch



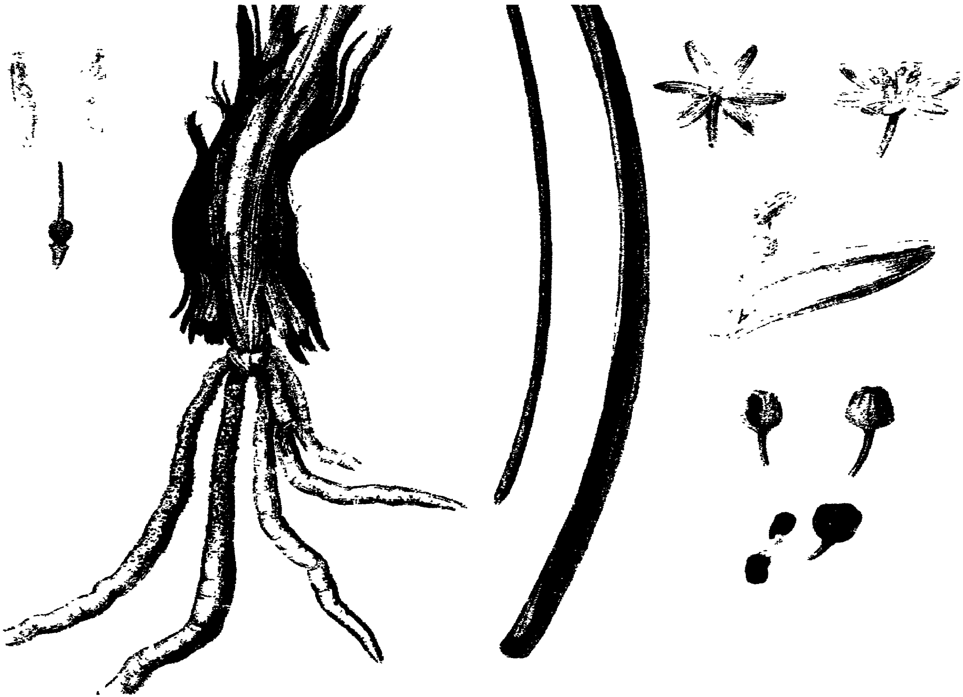
S. 2963.

Allium triquetrum. **Triquetrous Garlic.**

MDXL.

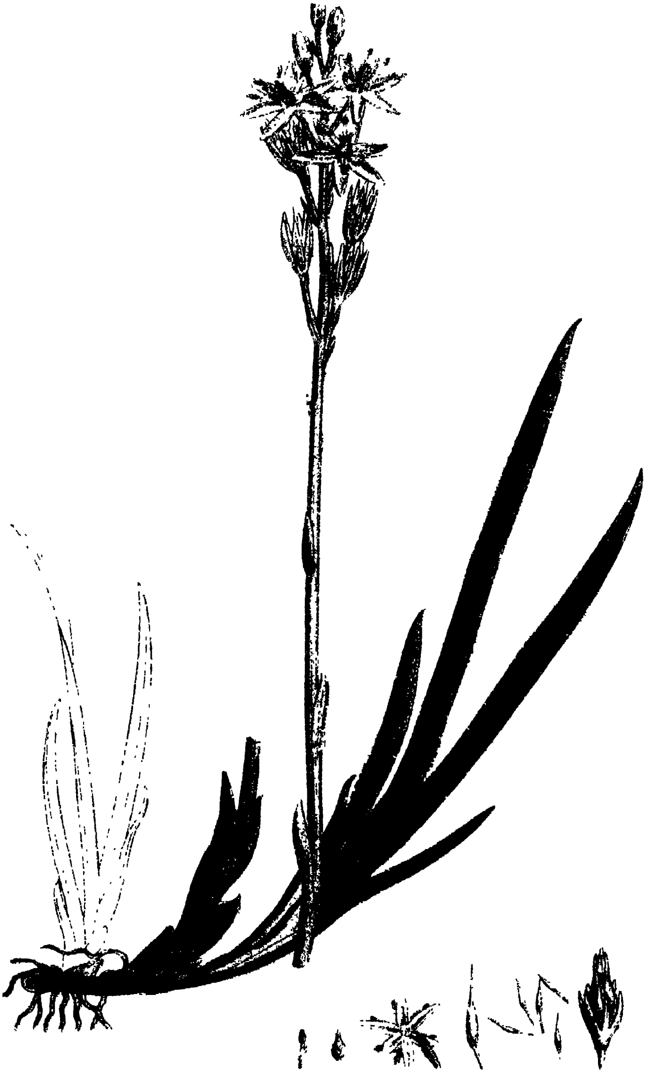


Allium ursinum. Ramsons.

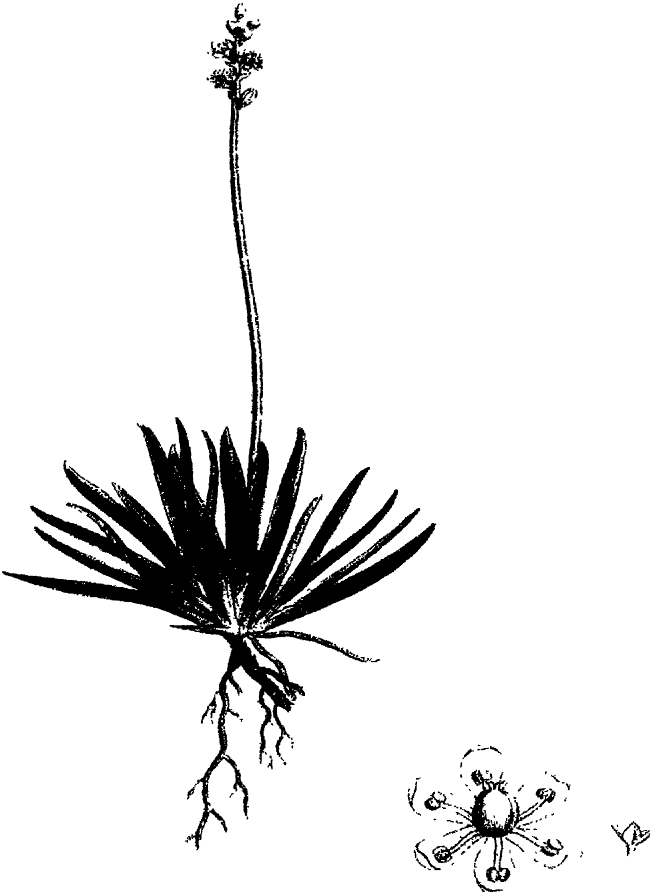


E. B. S. 2952.

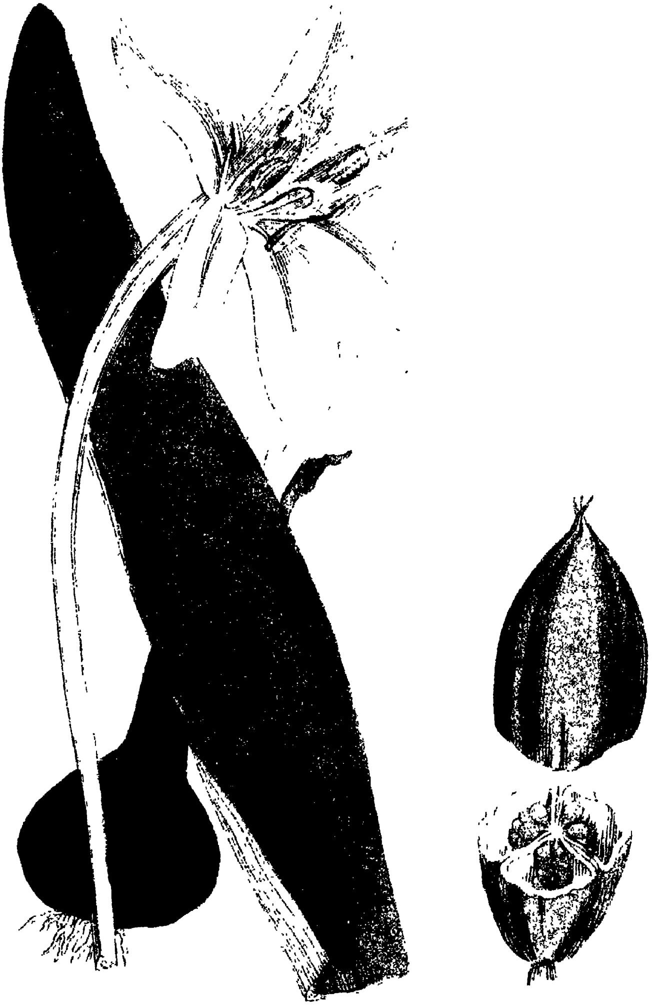
Simethis bicolor. Variegated Simethis.



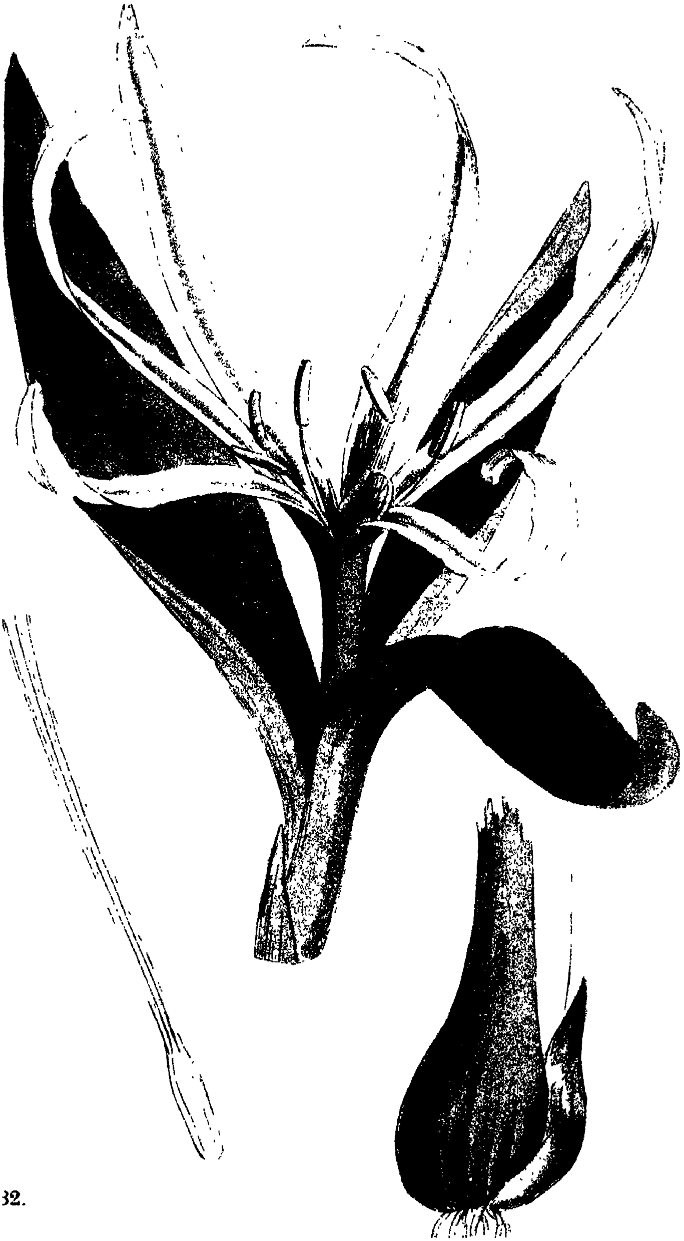
Narthecium ossifragum. **Lancashire Asphodel.**



Tofieldia palustris. Scottish Asphodel.



Colchicum autumnale. Meadow Saffron.



32.

Colchicum autumnale, vernale. **Meadow Saffron (spring-flowering form).**

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